

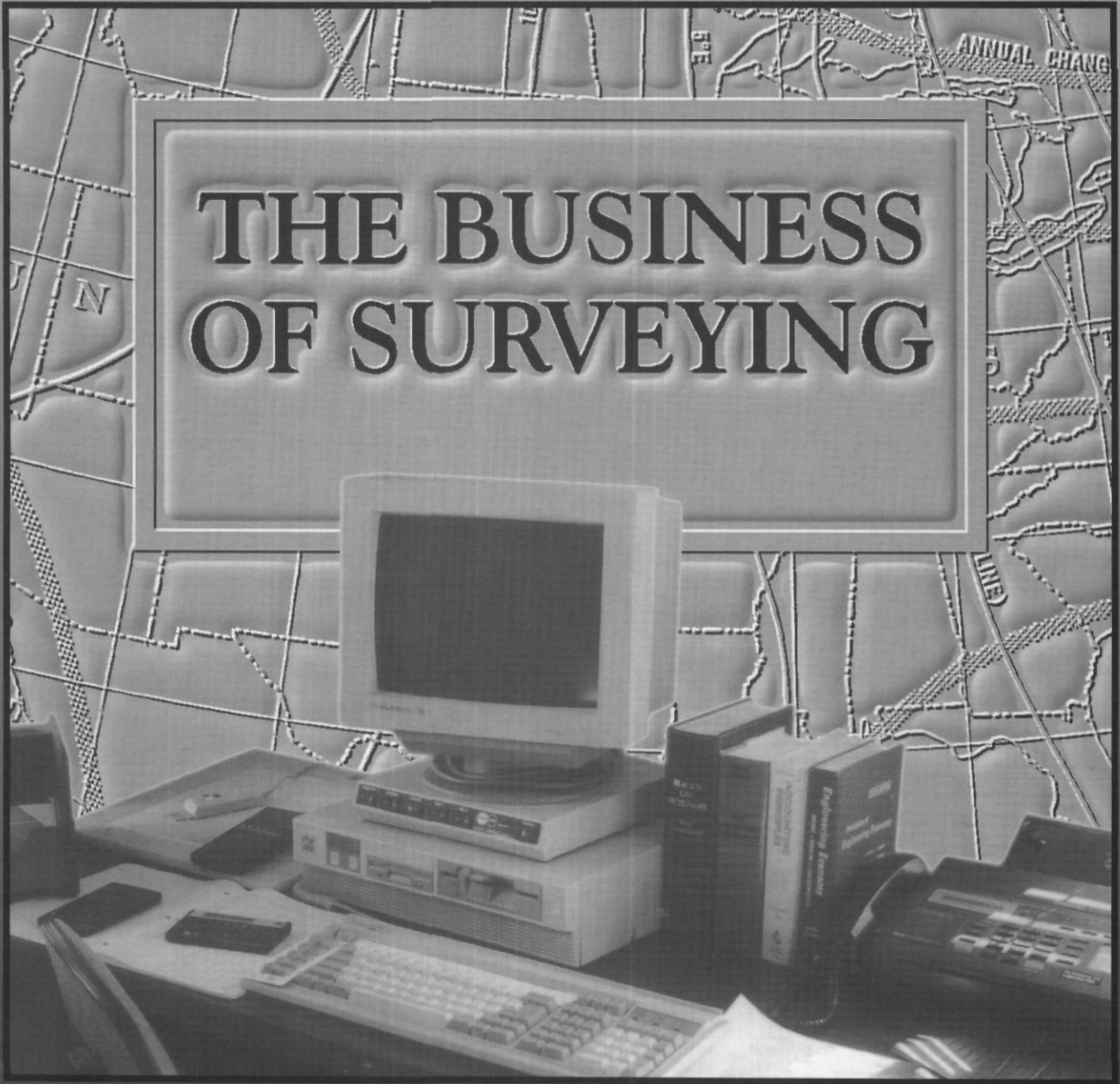
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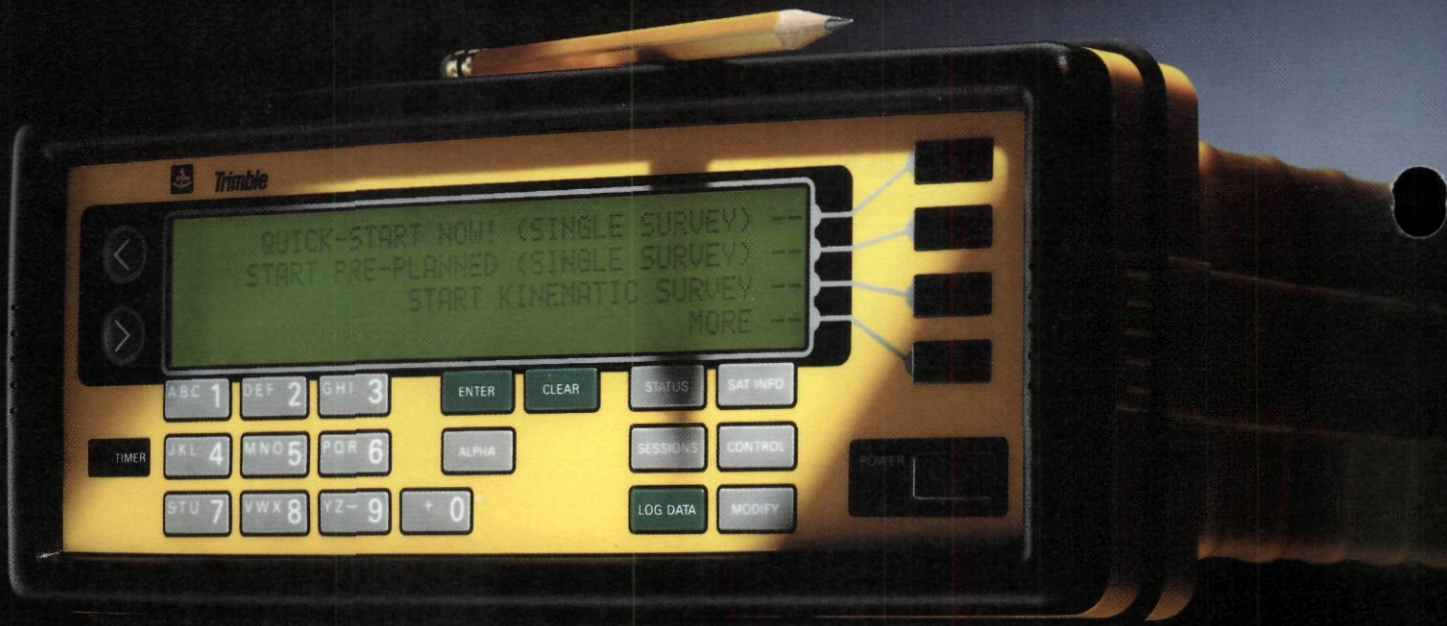
The California Surveyor

No. 99

The Voice of the Land Surveyors of California

WINTER 1992-93





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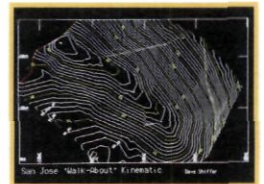
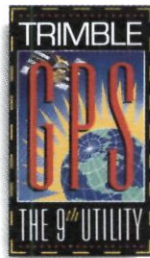


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The California Surveyor

is the quarterly publication of the California Land Surveyors Association, Inc. and is published as a service to the land surveying profession of California. It is mailed to all Licensed Land Surveyors in the State of California as well as to all members of California Land Surveyors Association, Inc. The California Surveyor is an open forum for all surveyors, with an editorial policy predicated on the preamble to the Articles of Incorporation of the California Land Surveyors Association, Inc. and its stated aims and objectives which read:

"Recognizing that the true merit of a profession is determined by the value of its services to society, the 'California Land Surveyors Association' does hereby dedicate itself to the promotion and protection of the profession of land surveying as a social and economic influence vital to the welfare of society, community, and state."

"The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of land surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in the Land Surveyors and their work."

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CENTRAL OFFICE

P.O. Box 9098, Santa Rosa, CA 95405-9990

EDITOR

Thomas B. Mastin, P.L.S.

ASSISTANT EDITORS

Michael McGee, P.L.S. - Linda Richardson, L.S.I.T.

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EDITOR'S ADDRESS

Thomas B. Mastin, P.L.S.

1303 Garden Street, 2C, San Luis Obispo, CA 93401

The California Surveyor

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By Clay Margason, P.L.S.

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Table of Contents

FEATURES

Automation and the Small Business Surveyor

by Robert J. Reese, P.L.S. 12

In Memory of James Hamblin, P.L.S. 5130 16

G.P.S. - The Lazy Man's Astronomy

by David Paul Johnson, P.L.S. 18

California - The Northeast of the '90s

by Tom Mastin, P.L.S. 20

George Derby - Prankster of Renown 22

Pheonixia

by George Derby 25

GRS 80, NAD 83, WGS 84 -

What's the Difference

by Michael R. McGee, P.L.S. 26

CLSA Advanced Technologies Committee (ATC)

by Michael McGee, P.L.S. 28

Benefits of CLSA 31

DEPARTMENTS

Application for Membership in CLSA 33

CLSA Conference Information 30

CLSA Officers and Board of Directors 4

CLSA Publication Order Form 35

From the Editor 8

Letters to the Editor 9

National News 29

New Members of CLSA 32

President's Message 6

Index to Advertisers

Association Administrators and Consultants 4

Cross Land Surveying, Inc. 31

Desert Engineering Group, Inc. 25

Garmin Communication & Navigation 17

Geodimeter 23

Ronald Greenwell & Associates 21

Haselbach Surveying Instruments 27

Kantum Precision 11

McGee Surveying Consulting 4 & 16

Nikon Surveying Instruments 19

Radman Aerial Surveys 7

SECO Manufacturing Company, Inc. 34

Silver Shield 5

StarPlus Software 21

Surveyors Service Company (SERVCO) 24

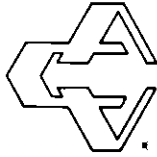
Surv-Kap 22

Trimble Navigation 2

Carl Zeiss, Inc. 7

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CORRECTION

In Issue No. 98 of *The California Surveyor*, on the advertisement on Page 9, the first sentence of the body text should have read:

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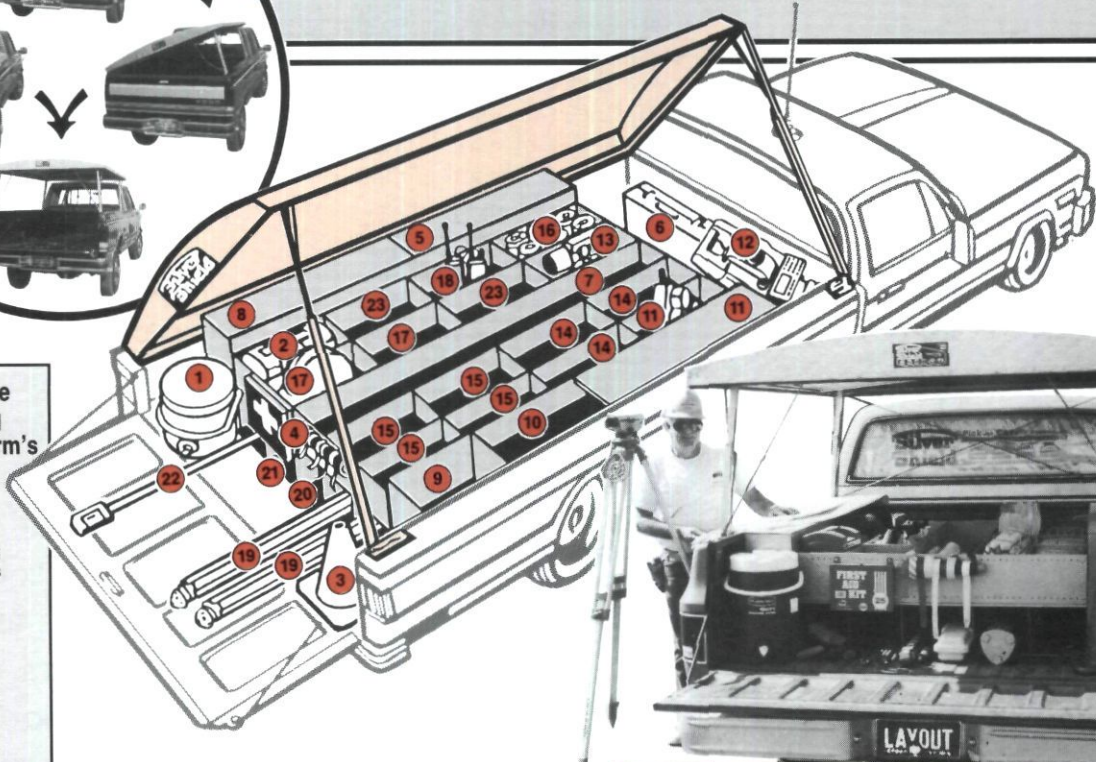
(See the correct advertisement to the left.) We regret any inconvenience this might have caused anyone.

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PRESIDENT'S MESSAGE

By Joseph W Betit, P.L.S.

THE EARLIEST KNOWN city map is scribed on a clay tablet and is of the City of Nippur (1500 BC), the ancient cultural center of the Sumerian civilization. The map has been compared to the remains of Nippur and has been found to be carefully drawn to scale. The earliest known depiction of a Sumerian surveyors "rod" and "line" is 2050 BC, 500 years before the map. This depiction is carved on a panel of a steel erected to extol the might of a king, Ur-Nammu. This king is also noted as the earliest (known to date) Sumerian ruler to codify and publish (on a clay tablet) a unified and comprehensive law code.

From the preceding, one can see that surveying is a very ancient profession. Surveyors have been providing vital services for over 4,000 years to their respective societies. Yet, until the last 20 years our surveying technology has differed in degree but not in kind from the Sumerian surveyors of ancient Iraq.

Today's surveyor now has a choice of many measuring and computation systems built around the new technologies of Electronic Distance Meters, Inertial Navigational Systems, satellite positions, and electronic computers. Today, and in the coming years, surveying will undergo as remarkable a change as was brought about by the Sumerian invention of the standardized line and tension staff (combo plumb bob and spring tension). Any member of the public will have unrestricted access to the accurate positioning of GPS, paper and mylar maps of all kinds

will be poured into the rapidly proliferating GIS databases, new maps will be delivered in digital form as a matter of standard practice.

However, the role of the properly trained and educated surveyor in society will not change. Furthermore, societies need for the newly evolved surveyor will increase dramatically. To attempt to remain stationary at this time would invite disaster and possible destruction of the ancient core of values and objectives of our profession. Yet, to press forward into the electronic age and forget the richness, strength and practicality of a 1,000 years evolution and adaptations of English land law that we are an integral part of would likewise be folly and a disservice to the society we serve.

We must strive to strike a balance while remodeling ourselves as a profession and evolve ourselves so that we may join the progress of the new age before us and bring forward with us the best of the richness and strengths of the old.

To accomplish this difficult but exciting task we must look to education as we never have before. Our college graduates will be well versed in the new technologies when they graduate. This summer Dr. Nader and myself put in long hours arranging \$500,000 worth of GIS (with full programming language) to run on the 16 new Sun workstations in the new Surveying Engineering GIS Lab at California State University, Fresno. Currently, we are working to form a new multidisciplinary coalition of the GIS expertise already on the CSUF campus. This effort is progressing at a truly astonishing rate. Local surveyors are becoming increasingly involved in surveying education. There are parallel efforts to ours in

Southern California, the Central Coast, Monterey Bay, San Jose, Sacramento and the Bay area.

However, the more difficult task is finding a way for the in-service practicing professional to participate in this training and education. The practicing surveyor is often geographically cut off from easy access

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to advanced surveying programs. I believe that the many years of struggle by the CLSA advocates of Professional Development directed towards reaching a consensus among the California land surveyors as to how PD is to be implemented will now be rewarded. Last year, Rob Hennon and the committee members of the Education Committee made great progress toward finding a common ground. Rob has agreed to stay on this year, and I believe he will be able to bring the PD issue to a successful closure. Under the PD umbrella the CLSA will be able to offer or support

the offering of certification and training programs in the new technologies for its members.

Continuing on the committee theme, many of the committee chairs are already on board. During the last year, Howard Brunner as our CLSA Rep. on the California GIS Task Force, did a terrific job on our behalf. Howard has agreed to scale back his commitments on the CLSA Legislative Committee and other CLSA Committee in order to concentrate on the impending GIS legislation to be put forward from the GIS Task Force recommendations to the Legislature.

Gary Leonard will stay on as Legislative Committee Chairman. Gary, Paul Cuomo, and Chris Russell will handle the normal legislative matters while Howard will concentrate on the GIS component.

I have decided to implement two ad hoc committees in the coming year. The first, to be chaired by Terry Hayden, will be to form a committee to study and report back on the necessity and the feasibility of forming a standing Photogrammetry Committee to better represent the needs and concerns of the photogrammetry community within the CLSA. The second chaired by Aleksis Rapkin, will continue to study the minority business situation, the related surveying business ownership issues and initiate a preliminary study of the actual makeup and constitution of minorities within the surveying community itself.

Tom Mastin and Michael McGee are both doing terrific jobs on their committees and they have both committed to staying on and continuing their excellent work in the coming year.

Kari Launen has agreed to Chair the Professional Practices Committee. Kari plans to pick up on Hal Davis's idea of extending the activities of the Professional Practice Committee to addressing the education of misguided agencies and to add a new activity related to the Mini-Brooks Act as well.

The Brooks Act misuses and abuses are an increasing problem. Rather than throwing money away on attorneys and

lawsuits, the committee is going to try a different tack. The committee is going to gather sources materials (Larry Fenske has graciously offered to provide the Cal Trans manual of procedures as a start) and seek out expertise on both the interviewer/evaluator and interviewee side to put together a training series that would operate similar to "moot" or mock court. Over the course of a one or two day seminar, the whole process would be reviewed for the benefit of both the intended attendees — members of public agencies and the surveying community. Kari and I both feel that most of the abuses of the Brooks Act process are a result of ignorance more than any other cause.

Finally, but not least, the CLSA needs to look at what can be done to attract new members from the ranks of those surveyors who have left the old Cal Council due to its being absorbed into a much larger and much more diversified engineering advocacy organization that feels surveying is a minor issue.

The CLSA has come through this year with increased membership (with a lot of hard work by Lloyd Cook helping out) and in a healthy financial condition. We have a solid crew of officers and committee members on board, and as usual, Dorothy Calegari in Central Office is keeping close tabs on it all. Even if the Legislature once again collapses into a one issue dog fight over the State Budget, we will still be able to press ahead on our own issues and try to pass on the CLSA to the next crew on watch in a little better condition than we got it, just as the many crews did before us. I am looking forward to the coming year and the opportunities and challenges it will bring. ⊕



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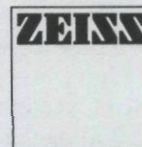
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FROM THE EDITOR

MAY YOUR '93 BE BETTER THAN MY '92

By Tom Mastin, P.L.S.

IF YOU HAVE READ *The California Surveyor* before, you will realize that I am not Brett Jefferson, however I am the editor of *The California Surveyor*. Brett left the position for the lame reason that he moved out of the State. Brett put quite a bit of effort and energy into the editing of *The Cal Surveyor* and continued the tradition of decisive editorials that his predecessor, Jeremy Evens started. It is safe to say that tradition won't continue.

Your first clue that I am not Brett should have been that Brett's picture is not in the upper left corner there; as a matter of fact no picture is up there (that is the tradition I am starting). Your second clue should have been that my name was under the title. That P.L.S. part I wasn't born with, it's just sort of been attached there. I think it is important that I give a short biography on myself so anyone reading this will understand from where I come. I've been a Licensed Land Surveyor in California for a while and been surveying for even longer. I've been a member of CLSA for some time as well as a member of my local chapter. I was editor of the CLSA News for a short time and have never before been the editor of a magazine. Most people who know me are wondering how I got this job. The answer is simple, someone like me is born every minute.

This is actually the second issue that I've had to feign responsibility for. I was lucky enough (as were you) in the last issue to have enough material so that I did not have to write a filler such as this. The last issue fell into place in spite of me, not because of me. I want to thank the Advanced Technologies Committee of CLSA and especially its Chairperson, Michael McGee, for their efforts in putting together the meat for the last issue. When Michael was offered the position of editor of the *Cal Surveyor* (Yes, I realize that means I wasn't first choice as editor, but I was told I was in the top 100), he turned it down with the promise of getting articles for the magazine. He has fulfilled that promise and will be called on again and again to fulfill that promise. It is critical that the surveying profession keep on top of Advanced Technologies so that the technologies don't advance beyond us. Michael Pallamary, as always, provided the most controversial article on the court case and the legislative analysis concerning lot line adjustments, which hopefully will have great impact on the surveying community for years to come. The other CLSA committee, which was very responsive to *The California Surveyor*, was the Membership Committee, whose Chair and only member is Lloyd Cook. Lloyd has been providing articles to *The Cal Surveyor* and the *CLSA News* and has been pushing others to do the same.

I have been concerned about writing this editorial ever since I was given this position back in January of 1992 (we are hoping you will be getting this issue in January of 1993, but worse things have happened). So, here I was going to have to write an editorial that would make abortion look like a kindergarten topic (Please no letters on abortion pro or con). So, since January, I've been racking my brain on

what subject to address. The only one, besides when am I going to get some work, which kept popping up, was how in the heck did I get this job. Oddly enough, I still haven't figured that out and I'm sure in a few short issues you'll be wondering the same. My English skills are maybe not the best. I was the benchmark for the SAT English test the year I took it; I was the 0 percentile person. I could never distinguish between a verb and a proverb in bonehead English. Although I have difficulty spelling my name, I do have a spell checker on my computer. I still don't know the difference between "Than" and "Then" or "Affect" and "Effect," or for that matter "Left" or "Right." By now you can see that I do make a perfect surveyor, but an editor for a nationally renowned magazine? I probably shouldn't even be editing this magazine.

By now, hopefully, some of you are thinking that there must be something funny going on, because the people I mentioned, along with a few others, always seem to have articles in the magazine. The truth is, they all have one thing in common: they have an idea for an article and they are able to write it down. That is all it takes. I am happy to take ideas for articles, but even happier for articles. I can honestly say that I will take an article on any subject. I can't honestly say I will print the article, but I will review it and seriously consider it. If anyone out there has an idea they want to write on, do it (or "Just Do It," I guess is the proper way to say it). If you don't feel you are able to make it shine (like this editorial), then rough it out and send it in. I will edit it (Editor comes from the Latin words "Edi" meaning "to Butcher" and "tor" meaning "it up").

Now the ground rules for submitting articles or letters to *The California Surveyor*.

1. Write it
2. Send it.

We truly prefer them to be sent on an IBM compatible disk (5¼ or 3½) in WordPerfect, ASCII, Wordstar, or any other common format. We will take it handwritten on the back of a lunch bag, if that is where you wrote it. The California Surveyor is unique in that it reaches every licensed surveyor in the State of California, whether a member of CLSA or not. Letters to the editor are an easy way to say something that is on your mind. The letter can address something in a previous issue or broach a whole new topic. There is something to realize about *The California Surveyor*: it takes three months from when all the articles are submitted until it is mailed out. That is just the way it is, so when you write concerning something in this issue, it will be two issues later before you see it in print. Your comments are still just as valid then as they are today, you will just have forgotten what you said by the time it gets out.

Well, maybe next issue I will editorialize on some emotional issue, or at least maybe I will have some work coming in. In fact, if I don't have work coming in, you may be reading an emotional plea. Our theme for the next issue is getting the magazine out. Until then, remember: a good surveyor is not the same as an accurate surveyor. ⊕

LETTERS TO THE EDITOR

■ THE REST OF THE STORY

Back in the mid-seventies a construction worker, in the course of laying out the slab for a home, used the wrong stake for the rear corner of a subdivision lot and the house was thus built in violation of setback requirements. The problem could be cured by moving the lot line without causing any further violation of lot area, frontage or setback requirements because of the size and configuration of the lots on both sides of the line. With luck, a Parcel Map could be filed to accomplish this. Optionally, the subdivider could tear the house down and rebuild it in the correct location because he still owned it. It was a close call, but it was decided that (with luck) the Parcel Map would be a little less costly. And thus the problem was solved.

The surveyor, who had experienced similar problems a time or two previously, happened to be on the Legislative Committee of the Cal Council at the time, and it behooved him to draft a bill that might forestall these difficulties and put it before the Committee. This he did, the Committee agreed with the draft as it was presented, and now all it needed was a name. One of the other members spoke up, and thus came to be.

Lot Line Adjustment

The guys on this Committee weren't rocket scientists, rocketry at that time being still unknown, but they were smart enough to know that initially offering a bill for consideration by the legislature is usually nothing more than running it up the proverbial pole, and that they wouldn't be able to recognize it when they next saw it after it had passed through innumerable committees, agencies, bureaus, associations, coastal people, animal protectors and a myriad of other rights groups. So it's understandable why they — and even their legislative counsel, Jim Corn — didn't consider the language more carefully before releasing it. Well, as it finally happened, the draft came back for the Committee's approval with only one innocuous change. In their state of shock it still didn't occur to them of the untold dangers that might lie before them and before many others, not including lawyers. A law was enacted. A law originally intended to cure little problems with little lots has found its way out to the pastures and into the mountains.

Now you know the rest of it.

Look forward to your retirements, guys. It's nice.

Frank Richardson, Retiree

■ MORE RESPONSES TO RIVERSIDE COUNTY

In response to the letter entitled "Riverside County

Surveyor Responds" by Raymond L. Mathe, P.L.S., in the Summer issue of *The California Surveyor*, I would like to point out a few things:

1. The County Surveyor's liability extends ONLY to his Certificate. At the risk of being redundant and perhaps in the hope that a few laymen may read my letter, this certificate states, "This map has been examined in accordance with Section 8766 of the Land Surveyor's Act on...day of.....19...". That is the entire statement. (Emphasis added.)
2. Section 8766 is specific as to WHAT the County Surveyor shall check.
 - a. Accuracy of mathematical data, which can only be accomplished if the survey is a "closed" survey. This is normally accomplished by requiring the Surveyor to submit calculations. (Time to proofread against map figures, probably 15 minutes is a generous estimate of most maps.) \$11.89
 - b. Compliance with Section 8762.5. (Only applies if a division of land is shown). Highly unlikely on a ROS. (Time to check is estimated at 2 minutes MAXIMUM). If an illegal map is submitted, back it goes to the author with a rejection slip. If this check is performed first and the map is illegal, the cost using Mr. Mathe's figures is \$1.53.
 - c. Compliance with Section 8763. Outside dimensions of map are 18" by 26" and has a 1" inside blank margin all around usually accomplished by the author drawing a 1" border line and never exceeding it. (Another estimated 2 minutes MAXIMUM.) \$1.53
 - d. Compliance with Section 8764.5. (To proofread three short certificates that never vary except for names and dates cannot possibly take over 2 minutes each [unless the checker is dyslexic, in which case he is not competent to do the job].) \$4.76
 - e. Compliance with Section 8771.5. (Used only if State Plane Coordinates are shown.) If shown, the map must show the coordinates of the control scheme. (Time to check if the control scheme is shown, 1 minute.) \$0.79. If California Coordinates are shown, this will greatly affect paragraph "a" above. (Proofreading these long strings of numbers from submitted calculations may triple the cost estimated in "a".)
 - f. Compliance with Section 8772. Did the surveyor either by legend or by statement indicate that ALL the monuments set by him were

identified with his license or registration number? (Estimated time to check for statement, legend, or labels from 1 to 5 minutes depending on method used by author and complexity of the map.) \$3.96

The total cost of checking those items the County Surveyor is charged with checking, (excluding those maps showing State Plane Coordinates) is \$23.67, using Mr. Mathe's rates. If we allow time for coffee breaks and BS sessions and quadruple this figure and add 5 1/3% for error in estimating, a maximum figure of \$100 MIGHT be explainable (although not justifiable).

Any other checking is a redundancy that is unneeded. The Record of Survey Map is simply placing the opinion of the surveyor before the public eye for their acceptance or rejection as they see fit. If the County Surveyor feels the surveyor's opinion is a bad opinion, he has every right to place a statement on the map to that effect. Barring noncompliance with paragraphs "a" through "f" above, any other checking desired by the County Surveyor is judgmental and should be done at his (the county's) expense. Or if the County Surveyor is a gentleman, he might call the author in after explaining that there would be a charge of \$45.77 per hour for consulting about what seems to him to be a poorly executed or inept survey that would probably damage the author's reputation if such a note was placed on his map. In a case of that nature, I would expect the practitioner to pay the bill himself and not burden his client with added expense. Needless to say, any allegation such as this had better be on VERY FIRM GROUND, or the County Surveyor will incur exceptional liability.

When I was still active and a County Surveyor complained about anything other than the 6 items he was charged with checking, my comment to him was, "If you don't like it put a note on my map explaining what you don't like and file the map. You have 20 days". As an example I had a County Surveyor tell me that their County required 3/4" pipes 16 inches long and I had set 1/2" pipes 30 inches long. My reply to him was to place a note on my map that I hadn't set 3/4" pipes, and file my map.

What escapes these bureaucrats is the fact that 98% of all maps filed do not benefit the client or the map's author in any way, shape, or form. They are filed to comply with the law and to benefit other surveyors, posterity, and the public at large.... Usually because the surveyor has set a monument not shown on any map of record.... ANY FEE, other than the recording fee is, to my way of thinking,

criminal. If I were practicing in Riverside County, I suspect they would see one or two Records of Survey per year from me, (only when my client requested one or would benefit from one or where a material discrepancy was encountered) and would be faced with bringing me before the Board of Registration and PROVING that I was in violation of the Land Surveyor's Act (not necessarily easy or cheap to do, because I did lots of work prior to 1982 when no map was required). I would at the outset of each job, explain to my client what the law says I should do, what it would cost him extra to comply, and ask him if he wished me to file a map (assuming no material discrepancies were found). I would inform him that ethically I would be bound to file a map if such discrepancies were found, and that it would normally be to his advantage for me to do so.

I would be interested in hearing from any Surveyor in private practice, who feels he can justify these exorbitant checking fees on behalf of any county. I wish to know why he thinks his client will benefit to the tune of \$300 to \$1,500 in fees, plus his costs of preparing this map.

Everyone seems to be unaware of the fact that a Record of Survey map is nothing more than the statement by the author of the map that this is his opinion of where things are or should be. If his opinions are good and his survey is proper, everyone will accept it. If his opinions are bad or his survey stinks (I've seen some!), then no one will pay any attention to it anyhow, except to refer to it on their map along with an explanation as to why they are ignoring it.

George R. Dunbar, P.L.S.

RECORD OF SURVEY CHECKING FEES

Following is a copy of a letter addressing arguments against charging fees for reviewing Records of Surveys.

Dear CLSA Board of Directors:

The recent demise of our legislation to eliminate the County of Surveyor from the Record of Survey checking process does not end the discussion or our responsibility as a professional Association. If we cannot succeed with legislation, then we must pursue some form of statewide assistance for the individual chapters in staying and even reducing the cost of checking Record of Surveys in each of the 58 counties of California.

My purpose here is to respectfully request that the CLSA Board of Directors direct the appropriate committee to update earlier studies of the costs and number of surveys recorded in the 58 counties of California. The survey and any other information available from our files in Central Office would be used to create a data base from which an analysis can be prepared assessing the trends in terms of checking cost versus the number of recorded maps. This data should be analyzed in terms of both population and the number of parcels so that different size counties can be compared.

I believe the survey will support the argument

that increased fees lead to a decrease in the number of surveys performed and maps recorded. A letter, with supporting data, along the lines of the one enclosed could then be sent from the State Association to all of the Board of Supervisors in California. All of the information would be sent to the individual chapters. The state would thereby provide the support and encouragement to the individual chapters who would follow up on the letter with personal contacts to educate their Board of Supervisors as to the benefits of recording Records of Surveys, now, before the next budget crisis occurs.

Sincerely,
Michael R. McGee, P.L.S.

Dear Members of the Board of Supervisors:

When a property owner requests a property line survey to locate their boundaries, the surveyor expends a considerable effort researching records and analyzing documents relating to their title. Thereafter, the surveyor goes to the field and takes measurements to relate the documents to the physical evidence, makes a determination as to the correct location of their clients property lines and sets markers at the corners, establishing the lines for all to see. The final task is the preparation of a Record of Survey map that documents the evidence found, procedures followed and the monuments set to mark the property lines. Although the map serves as important documentation of the survey it is esoteric in nature, and is of lesser consequence to the client who is more interested in the physical location of his property lines as marked by the surveyor's monuments.

The stability of property lines is temporal in nature. As time passes, original evidence of their intended location may be lost, and at some distant time in the future, a surveyor attempting to re-establish the correct position of a property line may arrive at a location not in agreement with old lines. The result will often lead to dissension in the neighborhood.

In years past, maps documenting surveys were not always filed in the public records. Surveyors who practice boundary location know too well, that had surveyors in the earlier part of this century recorded more of their maps, there would be less problems and less litigation today. Consequently, it would cost much less in many cases to perform a proper survey.

By professional accord and legislative efforts of the California Land Surveyors Association we have encouraged and required that maps of surveys be recorded and thereby made available to future surveyors.

The additional cost for the Record of Survey checking fee can be substantial compared to the actual cost of the survey and presents little added value to the present property owner. This additional cost will at times discourage owners from having their property lines correctly established or verified.

Recording a Record of Survey map does not benefit the property owner who hires the surveyor so much as his neighbors who may in the near future require that their property lines be estab-

lished. Additionally, their successors twenty year from now will reap the benefits, when a surveyor can re-establish the exact location of the present survey, avoiding turmoil and litigation.

The public in general benefits because surveys often establish the location of Rights-of-Ways for streets which simplify future public works project. Record of Survey maps are beneficial in the establishment and maintenance of Geographical Information Systems. Record of Surveys make it possible to accurately map out the location of property lines and easements based on actual field surveys and not paper maps that are stretched or distorted to fit each other.

Studies of the 58 counties in California indicate that where no fees are charged, the average number of Record of Survey maps filed for every 100,000 population is much greater than when a checking fee is required. The losers are the citizens who cannot afford to resolve their problems and their successors who must ultimately deal with them.

In closing allow me to restate, recording Record of Survey maps preserves in the public records vital information that will benefit adjacent and future property owners and the public. Lowering and eliminating checking fees for Record of Surveys will, in the long run, encourage the filing of surveys and result in a greater savings of time, resources and money for all.

Sincerely,
Michael R. McGee, P.L.S.

MORE ON CONTINUING EDUCATION

More thoughts on continuing education and requirements for a degree in surveying. Everyone benefits from continuing education. Regardless of his or her chosen field, they and their clients benefit. Show me a person who knows all there is to know in their field and I will show you a person who cannot see past the end of their nose.

Surveyors are a strange breed as I am sure you know. Surveyors don't work in this profession because it's just an okay job, or it passes the day in a somewhat pleasant manner. They work as surveyors because they like it! I have been a surveyor since 1955 and I cannot honestly think of a day that I did not enjoy my work. Any surveyor that will talk about it will admit the same thing. We have fun in our work whether its beating the brush in the back country looking for an original corner, or fighting traffic in the city — we enjoy our work.

The problem most surveyors have is they arrive at a certain level of competence — (either party chief or licensed). They then start to vegetate. Then along comes someone saying — educate instead of vegetate! The usual response is — "leave me alone — I'm a surveyor, I know what I'm doing."

This is where we go wrong. The world is changing and without a system of continuing education, we fall behind a little further every day.

How much are we changing? Who out there remembers a canyon chain, a gurley transit? Now we use GPS to measure across the canyon, we use

digital transits to replace the magnifying glass, and educated eyeball of the gurvey transit days; field computers instead of log tables.

Continuing education is a must. Mandatory continuing education, however, is a good question. I take as many continuing education courses as I can afford (time and money wise) per year. I have traveled from San Diego to Pasadena, Pomona, Riverside and San Bernardino for continuing education classes. These were all on a voluntary basis. If a federal or state mandate requires that I must take certain classes in order to relicense, I will probably dispute you. I know where my strong points and weak points lie and I know where I need continuing education.

On the need for a college degree as a condition of licensure; I agree it should be a requirement. I think part of a degree program should be an apprentice program where a candidate is required to work for a minimum of two years with a firm specializing in surveying. I am not talking about the union apprenticeship program — it's fine for what it does. I am talking about a list of companies in California who are willing to spend the time and effort to train and grade a person who works for them for a minimum of two years. The grades could be reported to the college that would offer the apprentice his or her degree. This would solve two problems. The apprentice would come to the firm with the appropriate

educational background, and the firm would assist him/her in obtaining the practical field background. That person, once they serve the two year apprenticeship would then receive a degree in surveying and be free to seek employment any place they desired.

Any interested parties — let's hear from you.

W. Richard, LS 4451

■ MORE ON THE LS BLUES!!

When I received my Professional Land Surveyor exam results and found that I lacked four points to pass the exam, I was very disappointed. After the wake I decided to appeal the results. I'm glad I did (I think).

I sent in my \$10 for a copy of my answers and an outline of the acceptable answers to the questions on the exam. I also received a list showing the number of points I received for each question. It was up to me to determine which of my answers were accepted and which were rejected. It was a lot like solving a jigsaw puzzle. At least all the pieces were there (I thought).

I spent many an hour trying to determine which of my answers were rejected and why. I appealed any possible answer that could have been misconstrued. Many of the answers I appealed I probably

had already received points for but there was no way to tell.

After much soul (and reference book) searching I finally decided I was ready to submit my appeal (along with an additional \$80, of course). I sent the package certified mail just to make sure it arrived.

Yesterday, I received my return receipt. Along with the receipt I received another package from the Board of Registration. It contained numerous "alternate acceptable answers to test questions" and a letter saying "sorry for any inconvenience". It did not contain any information on how to call back an appeal that had already been received and redo it.

One of the alternate acceptable solutions was an answer I gave on the exam. It was worth four points. I only need four points to pass. I did not include this question in my appeal package.

I decided that the only way I had a chance of this additional appeal being included in my package was to send it to the attention of the person who said "sorry for any inconvenience."

We'll see what happens. I won't hold my breath. (Maybe if I sent another \$80 it would get their attention.)

NOT!!!

Linda Richardson, LSIT



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AUTOMATION AND THE SMALL BUSINESS SURVEYOR

By Robert J. Reese, P.L.S.

Overview

There is no doubt about it, computers are here to stay. From the timing and programming chips in your coffee maker to the complex communication systems used all over the world, computers have inextricably become a part of our lives. It's appropriate, too, that as a professional surveyor you keep up with this technological wave of computing in a way that makes you feel comfortable. True, the field of computing changes daily, but you don't need to have a masters in Computer Science, or be an Electronics Engineer to reap the benefits of proliferating uses and hardware. Actually, all it takes is patience, forethought, and the willingness to **push that button!**

This is not meant to be a complete how-to on automation, a comprehensive software analysis or a guide to all the acronyms for New Users of Technological Syntax (that's NUTS). But if you're considering buying one of those mystical boxes with the TV on top, and if you wonder how it might fit into your business environment, this article can help alert you to some of the fundamental questions that need to be answered at the beginning of the process. I'm primarily addressing a first time user, but the principles are similar no matter what your level of technological development. You are unique, your partner (if you have one) is unique, and your rodman, instrument man, technician, administrative people and your licensed surveyors are unique, if you have any of these at all! It follows that your automated system will be unique. Yet you can't separate the hardware from the software, or the people running it

from the people designing it. Your success at handling this interdependency will probably determine to a large extent how successful you are in bringing automation into your small business.

The Basics

The big question: is automation for you? Ask others that use the automated approach. Let's face it, automation is not cheap, and I'm not talking about just dollars. It takes time and cash, and you have to be willing to experiment. What once took hours of toil with traverse sheets, trig tables (remember those?) and ancient calculators now is done so fast your coffee won't even get cold. But certain aspects of a project are constant whether you're an automated office or not, so don't expect computers to cut your time in half the first time around. It's in the repetitive chores that setup and execution are cut drastically. Say a client would like to change just a couple of closets and a bedroom in that two-story house you designed for Mr. and Mrs. Wallet on Welltodo Place. Automation can allow you to perform the changes seamlessly, plot the plans out and you can capitalize on your previous hard work. The new folks get a first rate job in half the time for a good price that took you one-quarter the time. And the benefits are directly proportional to how much you put into the endeavor. Topographic surveys that used to take three days to complete can be ready the same day. Boundary work can be analyzed and turned into a plat in half the time. Spreadsheets can speed up structured arithmetic data. This all translates into real client service. However, if you're comfortable with your

present system and it works for you and your clients, well, don't fix it if it ain't broke. But if you *are* interested in exploring the possibilities, here's a few suggestions.

Stick to your niche. If you're successful at boundary surveys, use the new tools to enhance that service. If construction staking is your best suit, find the products that will adapt to that work. If you expect automation to allow you to do things that you don't normally do, chances are your new technology will get in the way, and you won't be giving the public, your clients or yourself the level of professional service that you both deserve.

Getting Started

Learn all you can beforehand. If knowledge is power, then being prepared is prescient. There are many reasonably priced resources for learning computer literacy: spreadsheet tutorials, word processing classes, and computer aided drafting courses. The most basic skills needed are knowledge of the operating system and typing. If you have some time, enroll in a class that deals with these. That way your hunt and peck typing won't keep you later at the office than you need to be and simple file management skills won't have to be learned concurrently with new application software. Unfortunately the local community college doesn't give TurboSurvey 101 classes. It will be up to you to make good decisions about the company you keep while adapting to a new way of doing things.

Be curious. Be insatiably curious. Ask questions of yourself, the software, the hardware, vendors, other surveyors: ask questions constantly. So often new software or hardware looks like so much new ground to be explored. This ought not to be a problem as surveyors are continually asked to become oriented quickly with unfamiliar territory and then map it with precision. Use the organizational skills that you use every day to map your route to successful use of automated products.

Have a map. Open ended, unplanned development is inefficient. A plan as to what you want will cut the unnecessary exploration dramatically. Software vendors are SHOCKED to have a potential client show them a

list of requirements and say "Can your stuff do this? I plan to have these capabilities on line in six months." If their answer is no, don't waste their time and yours. Probably the best thing a development plan will allow is adjustment of an actual schedule so that you can reach your goals.

Stay flexible. Not everything plugs in and works. About the only thing in your automated office which MIGHT do that is the coffee maker. You wouldn't be alone if the software you bought doesn't crank up due to some setting buried deep within dark corners of your system. And you may find that the shiny new piece of hardware that the salesman said would outdraft Inky Tom the Rapidograph Monster needs more than the on/off switch to operate properly. Frustration will detract from your forward progress. Be willing to adapt to "unforeseen operational developments" in your hardware and "undocumented enhancements" in your software.

Be patient. The learning curve that you've heard about is, at first, not a curve but a pancake-flat line. Expect this. As you find out how to manipulate your computer, your ability to anticipate problems by recognizing past ones will increase. All this takes time and effort. To think "today the drafting arm, tomorrow the plotter" is a just a little simplistic.

Be willing to spend some money. Even with the most conservative automation schedule, there is software, hardware, training, updates, support, maintenance. Talk to your accountant. See how the new equipment is to be depreciated and budget accordingly.

Whether you're a two-person business that elects to get a data collector so that transfer of topo data can be facilitated or you decide to provide your twenty-five employees with computerized tools to produce full service surveying and engineering, the hardware, software, and people are all woven together. The more thought that goes into the process now will enable a better measure of success as skills develop.

Hardware

Of all the things that herald your arrival at the doorstep of automation, the most visible is the computer and

all the peripheral machinery that gets plugged into it. And there are as many configurations of hardware as there are people willing to sell it to you. So what's the best? If you talk to others that deal with the type of work you do, you'll start to find predominant patterns. Don't reinvent the wheel. If a majority of users have a certain kind of operating system, or if they are using software packages that produce results with a certain level of computing power, there is probably a reason why. Ultimately it is your decision and here are some questions that ought to be considered when shopping for your hardware.

What type of computer "platform" will you be using? Mini-mainframe? Personal computer? Work station? What are their physical requirements? How much do each of these types of systems cost? What will your applications be: intensive number crunching or graphics?

What type of operating system will run your new machinery? Unix? MS DOS? OS/2? Macintosh? What is an operating system anyway? Do you expect to network a system for the employees to whom you wish to give computing power? Does it conform to EISA specs so that new programs for 32 bit processing can be utilized? Ultimately, the amount of software — or programs — that is written for your field of expertise on a particular operating system will determine how useful that operating system is for you.

What kind of compatibility will the computer you're buying have with things such as video adapters, memory cards, sound cards, plotters, printers, modems, scanners, data collectors or the software you have chosen? It is not to your advantage to need a lot of proprietary systems and hardware to get a job done. Technology changes so quickly, keeping up with it is a full time job. You have no freedom to take advantage of an improvement that comes along if your system can only work with one manufacturer's products.

What kind of support will you get? Vendors that give you a great price, a box and a kiss goodbye will cost you in the long run. Make sure your supplier is credible, has a good track record for service, and has somebody there that knows exactly

what they are doing. Ask for a customer referral list. Friday afternoon, just as you hit the <save> key for that rush job and the screen goes psychedelic, is no time to begin a tutorial on video electronics. Having someone available to help you when you really need it is worth the higher price you may have to pay.

Will you have a consultant on-call for maintenance or will you rely on your vendor for advice? Or will you decide to move that roll-a-way cot into your office after all? Do what you do best! If you are a surveyor, survey. There are plenty of consultants that, for a fee, will answer questions, recover the disappeared data files, diagnose a recalcitrant hard drive, find the right CMOS settings and explain it all to you while they do it. True, you too can learn how, but your bookshelf may end up having more technical manuals than survey texts. Your supplier may have a very talented person available also, but they do have a vested interest in providing more than just technical advice.

As always, there is the question of money. Today's computer systems have computing speed and power that would have turned a computer five years ago into a pile of rubble — and costs about one-third the price of that old machine. These are interesting times in the world of high tech. Ultimately, the person that benefits from development is the consumer, but it exacts a price. The system you just carried out of the store in packing foam today may be obsolete in three years. Budget enough money to keep upgrading your equipment, but realize that there is a limit to useful upgrades. Find your computing level and use it to its fullest.

Software: How To Get It

Software is programming written by real people. Hopefully the surveying and related software you get is written by real surveyors. It is to their financial benefit to produce good, intuitive, organized programs so that you'll tell everyone how good their stuff is. But finding software that is usable and productive, that doesn't require a four year degree in it and what will fit your budget will take some research.

Before you send off your check and wait eagerly for a few small diskettes, a manual or two and the beginning of what I hope is a fun and productive process, consider some of the items that follow.

What kind of software will you need? Remember, do what you do best. If a vendor offers a package that does everything including making toast if you slip bread into the floppy drive, but all you want to do is plot some cross sections, pass it by. If your short term goal is to try automation out with a coordinate geometry program, review the ones that do exactly that and ignore those that also do hydrology, pipe sizing, and legal description writing. Do you provide architectural services, engineering, planning? Software and automation are not relegated to just technical subjects either. If your accounts receivable and bookkeeping need organization, there are quite a few off-the-shelf programs that can do the job. Do you have number crunching, charting and graphing requirements? Spreadsheets are available that cover just about any level of complexity you wish. And almost every new computer will already have some sort of word processor already installed.

Where do you find lists for available software? Most trade and computer magazines will get you off to a good start. And other professionals will generally be glad to describe their experiences. Word of mouth is the most powerful advertisement there is. Another excellent source of first hand experience with software is the A/E/C conventions at which all these hardware and software companies put their best foot forward. There is no better place to see state of the art software and hardware all in one place. It is certainly worth the expense and time and you'll probably come away with several demo disks in hand. But go with an agenda, or you may wander around for two days dazzled by the world of automation.

When you have decided on the software packages that seem to fit your needs, call their salespeople. Your initial contact can tell you a great deal. Purveyors of software range from basement businesses to huge corporations. You may find what you want in either place. Have

a checklist ready for each inquiry and evaluate them on as even a footing as possible. Most of all, tell THEM what you want and ask if their software will do it. If it doesn't, move on.

Ask them how long they have been in business. Five years is a pretty good length of time for any company to be providing a software product. What kind of user base do they have for businesses like yours? Do they sell through dealers or will you be purchasing through their own sales network? What operating system(s) is their software written for? Can you get a free demo disk? There's nothing like test driving the software yourself. An on-site demonstration of a fairly comprehensive software package is not out of the question, but the sales rep probably types faster than your secretary and is intimate with the program's routines. Time alone with the demo version is a good test. Reputable software companies should also have a list of references of happy users who will usually give you a candid assessment of the product. You may be on that list some day.

Find out what sort of environment their software uses. Some software relies on the graphic capabilities of other CAD (computer aided drafting) software. It requires the other package be bought and installed, so that must be figured in to your plan. Others have their own graphics capabilities and are stand alone installations. This is an important difference. There are pros and cons for both types, so make sure you get an opportunity to see the strengths and weaknesses of the two before you've committed to either.

You also have certain ways that you're used to doing things. Some programs have attractive customizing features which will allow you to tailor output formats, reports and command structures. If this is important, ask the salesperson if this is available.

What is their arrangement for support? Do they even have support? Can you call anytime or just business hours? Will the nickel be yours or do they have an 800 line? Find out what you get for the price of support. Ask to get a copy of their license agreement. Software is generally **licensed** to you, not **owned** by you. So there will be a contract. It should clearly

and succinctly describe the terms of the agreement and be acceptable to you in case either party cannot live up to the agreement.

What type of copyright protection or security do they employ? There are hardware locks, internal program installation counters, and there are packages out there with no copyright protection at all. There is even free software called public domain software that is distributed for a donation. Can the software be installed on more than one machine? Some protection devices and agreements don't allow this.

How about their documentation and manuals? A manual is the first reference source you have to answer questions. If the manual is clear and well organized, you'll save time. But if not, you may be hampered by having to call the support line to resolve some problems. If the software is worth its price, quality will have gone into the manual too.

What is the arrangement for updates? Are there any, and if so, are they free, do they cost a minimal amount, or will it be the same as buying a whole other package and starting over? Much of your support dollar goes for product development: sometimes updates (or new versions or releases) are done to provide enhanced capabilities and to keep up with the times. Some of your support dollar goes for fixes: keep in mind just about all software has bugs. These bugs may be a small inconvenience or they may be serious glitches. Also, most software companies realize that not everyone wants all the capabilities their software has to offer, so their software may come modularized. If so, are modules or packages upgradeable and do you get a discount when that happens?

Also ask if there are any special hardware requirements that their software has. Although memory, processors and coprocessors are rapidly becoming less expensive, cost is always a factor and hardware intensive software may not be for you.

Software itself has protocols and formats for how it handles all the information it receives and generates. If you plan to have several facets of your business automated, try to make sure that whatever software you do install will talk to other software packages.

Does the data collector work with your total station? Can you download its data to your computer and will it allow you to adjust the format so your coordinate geometry program will use it? Does the terrain modeling software allow you to plot on the plotter you had your eye on?

Software: Now That You Have It, What's Next?

Try it out! Explore it! But don't let it sit in the package. Have a few small successes and think of how you can put these newfound abilities to productive use.

As with any tool, how you use it makes all the difference. After all, software is only a tool. As an apprentice, you cannot be expected to become a journeyman overnight. Nevertheless, journeyman status can only come through constant work and improvement. The excuse heard most often for not using a new approach is "I don't have time to learn this stuff right now, I have to get the job done!" (This is heard from the people who might benefit the most.) And make sure you find out what that one obscure coordinate geometry command (which you've never used) does. Push that button. It just might be the thing you've been looking for to figure complicated street intersections. The potential is great, but not taking the time to explore, develop and find creative ways to use automation will defeat it from the beginning.

What does all this software do? It produces data. It produces files. It produces information that can be transferred, updated, copied... and LOST! Along with computer automation comes the necessity to deal with security and backups. Up till now you had your desk, your drawings and the file cabinet for reports. But this mysterious, invisible, electronic data is subject to much more than getting lost on your desk or coffee stains on the drafting table. Learn to make copies of your data files and keep them in a safe place. Learn to save the work you have been doing frequently, because unlike those mylars you're used to inking, some very important mapping projects can evaporate before your eyes. If you do have consulting help, ask that person for guidance on

backups, access security measures and the most pernicious of all hazards, computer viruses.

One of the advantages to automated production of drawings, reports, plans, etc. is consistency. Your title sheet can have the same symbols, the same line types and the same general notes as the other plans — you don't have to start from scratch every project. This means that each improvement on your presentation can carry through to the next one. Unfortunately, the initial tendency is for everyone in the office to have their own personal symbols, colors and standards (Amanda likes to label her construction plans with Heavenly Script and pastel colors, while Roger's Records of Survey look like newspapers with each line on a different layer). Develop standards that everyone can understand, that can be repeated and that won't cause wasted time because you have to edit the legend for every project. In creating standards, enlist the help of the people who will use them because they're the ones who understand the nuts and bolts of how the standards fit together.

An issue that highlights today's high tech questions and one that you will need to address is that of data transfer. If you elect to provide your clients copies of your mapping projects in an electronic medium, how will you safeguard the integrity of that data? You will need to examine what measures you can use to safeguard your work.

Implementation

This is the part that has no manual, no 1-800-DISASTR support number, and no 1-year/30,000 meg guarantee to fall back on. But it can be very rewarding. It is how you put all these tools — the software, the hardware, the expert help and the people — to work. The end result can be a professional service with a product that looks professional, has a greater degree of quality control and can be produced efficiently.

As with procuring hardware and software, just how smooth the transition will be depends on your planning and flexibility. But do make a plan. Whether your organization has an occasional helper (who just might

be your spouse) or a couple dozen full time employees, a plan for the transition will provide the yardstick by which you can judge automation's effectiveness in your company.

People — you and your people — are going to use this new tool. After all, they are the heart of an organization and their productivity is paramount. Get them involved in the process from the beginning. Try to look at your current method of project management. Is there a well-defined flow of work? Are there individuals with specific jobs and proficiencies? Give those individuals the right tool to do their job better and faster. If you don't have a work flow, maybe it is time to develop one. One or two employees who become expert in one or more specific operations of software will be more useful than several people marginally acquainted with the whole package. Who's the artist? Give that person the drafting software. Who's the analyst? Let them do the calculations. Natural talents will surface quickly. What is surprising is where the talent lies. Experience has shown that plans for who would get on the technological bandwagon within our company turned out to be completely opposite. And computer literacy has no age limitations, either. Sometimes the people most eager to try out new technology are the ones who have had thirty years or more doing a job, and they see it as freeing them from the vapid, tedious aspects of their profession, allowing them to be more creative.

Assigned jobs for a specific project can help. If one person can use the plotting routines for several jobs, you'll have an individual with a capability you can call on when the push is on. Do you have a team type project management system? If so, a percentage of the job can be specified to be computer generated.

Yet try not to put all your automation eggs in one employee basket. If Bill's the only person who has learned to manipulate the least squares adjustment program, what happens when Bill is off on a vacation and several three dimensional networks need adjustment?

Try to utilize a vertical type of implementation that builds on top of

(continued on Page 16)

IN MEMORY OF JAMES HAMBLIN P.L.S. 5130

JAMES A. HAMBLIN, P.L.S., and his wife DeAnna L. Hamblin were killed on November 15, 1992, when their single engine Cessna crashed into a canyon about two miles east of Clearlake's Pearce Airfield.

Jim and DeAnna were taking their son Michael, 19, who survived the crash back to school at California State University, Chico. Jim, who owned Aero Cartographer in Santa Rosa since 1982, was known as an excellent pilot. He got his pilot training in the Air Force and constantly flew his Cessna as a part of his business. The Hamblins were a close knit and well liked family who enjoyed the outdoors.

Jim was active in coaching local youth sports and the family was known for their activities. Their last major outing was a summer sky diving adventure.

Jim Hamblin was a member of the Board of Directors of the California Land Surveyors Association representing the Sonoma County Chapter as well as past president of the Sonoma County Chapter. Jim was active on the Board of Registration's committees for preparation and grading the State Land Surveyors Exam. Jim was always personable, easygoing and had a very genuine quality about him. He always volunteered his time to help the profession and CLSA. Those who knew him will miss him greatly.

A trust has been established for Jim's son. Anyone wishing to make donations should send them to Mike Hamblin Trust, c/o Redwood Credit Union, P.O. Box 6104, Santa Rosa, CA 95402. The Sonoma County Chapter of CLSA has established a scholarship fund in Jim Hamblin's name to be given to surveying and/or photogrammetry students. Terry Hayden and Howard Brunner are coordinating the scholarship. ⊕

AUTOMATION (continued from Page 15)

small isolated successes. For instance, your first step in a subdivision improvement project would be the site study and contour map. You can use computer generated topo maps for conventional hand plotted cross sections and volumes, but to expect computer generated volumes while you're still plotting contours by hand is unreasonable. In planning out the useable capabilities of your systems, try to avoid duplication of labor. Remember: "layering," repetition, and revision are where this stuff shines. Once you have plotted something from a CADD project, it can be replotted quickly for many purposes at many scales for use by many people.

Try to allow yourself and others plenty of time and chances to steepen the learning curve. Subscribe to trade magazines. They have all sorts of departments for the neophyte and the expert. Provide an environment conducive to experimentation, learning and, most importantly, communication. Expertise in word processing, spreadsheets and land design software needs to be made available to those needing it, so see if there is a common time at which people can ask questions, offer suggestions or brainstorm about the software they are using. Study groups, user groups, tutorial sessions — call it what you will but it can allow those who have a natural talent for exploring new tools to share it with others.

Outside training is something that needs to be figured in to your program because you can't rely on a

keen sense of curiosity and dedication to carry everyone through to technically gifted status. Everyone needs to grow and learn, and if you have a specific plan and a job for someone, they can see a purpose in going to a local high school's class on computer aided drafting and will be eager to try what they learn.

Finally, the fact that automation and computers will make you more efficient and faster needs to be offset by how much more of the market share you'll have because of faster production, better revision capabilities and greater flexibility for a client. Be creative. These are cautious times when it comes to spending and earning money. On the one hand keen competition in the high tech world provides you more affordable higher technology. On the other hand competition thins the margins earned for the professional services and expertise you offer and for the liability to which you are exposed. If automation, on a level that you're comfortable with, can garner just a little more of those thinner margins for you, doesn't it deserve a closer look? It probably won't be long before you're producing perfectly flawless myx;la kjdfpo!!

As of today, Bob Reese is still the head of the Surveying and Mapping Department at Garing, Taylor and Associates, Inc. in Arroyo Grande, California. He has had first hand experience in selecting and test driving hardware and software for that firm. He has also spent more than one night recovering from smoke-testing components that were thought to be compatible. ⊕

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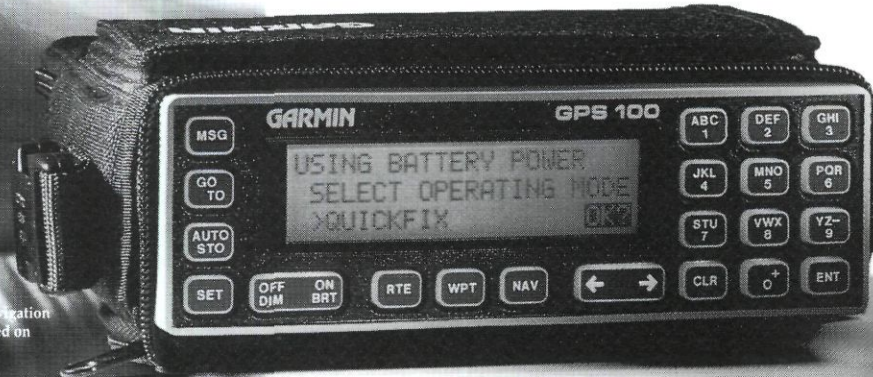
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G.P.S. — THE LAZY MAN'S ASTRONOMY

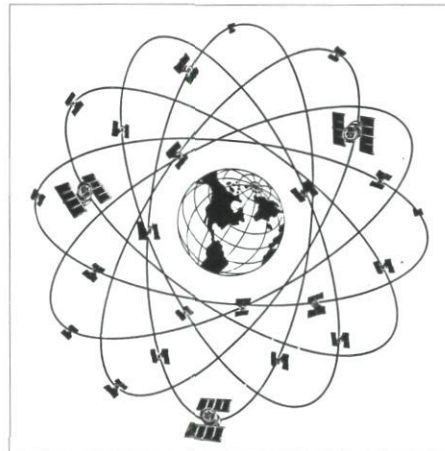
By David Paul Johnson, P.L.S.

THE GLOBAL POSITIONING System, commonly known as G.P.S., is in effect, a man-made solar system. Yesterday's astronomers, Kepler, Copernicus, and Galileo, recorded the motion of the stars and planets as they moved across the celestial sphere in what turned out to be, very consistent and predictable paths. These planetary motions were observed with crude instruments and noted in a book of tables similar to a bus schedule or Farmer's Almanac.

Today's astronomers use this solar almanac, called a Solar Ephemeris, to locate a desired star on any given day of the year. Given a known point of observation, or "position," and accurate time, an astronomer can use a Solar Ephemeris to calculate where a chosen star is in the sky, at any given time, on any given day. Making a Solar Observation and noting accurate time, an astronomer can also calculate the position of a previously unknown point of observation anywhere on the surface of the earth. Using the Global Positioning System, today's astronomers have access to this same kind of position fix information almost automatically.

The G.P.S. satellite network (as of late-1992) is a constellation of 19 man-made stars (24 upon completion) positioned in closely monitored orbits approximately 20,000 kilometers (12,000 miles) above the Earth. These G.P.S. satellites are all equipped with a radio receiver/transmitter, which allows updated satellite position information to be transmitted or "uploaded" into the individual satellites from Earth-based tracking stations around the world. This updated satellite position information is then transmitted or "downloaded" to G.P.S. receivers used for general navigation purposes and for precise, long distance, Geodetic measurement.

A simplification of the Global Positioning system would be similar in theory to the child's game of Blind Man's Bluff: where a G.P.S. receiver



Graphic
Courtesy of Trimble Navigation

would be chosen as "It," and in effect, left blind folded and unaware of its location or position, in relation to the constellation of G.P.S. satellites. From this unknown position, a G.P.S. receiver will continue to receive satellite position fix data transmitted from the precisely monitored satellites, which in effect, occupy precisely calculated and thereby known positions. This process, known as instantaneous or real-time positioning, must continue until a G.P.S. receiver is able to collect enough satellite signal data to determine a real-time navigational position fix in relation to the orbiting G.P.S. satellites. G.P.S. real-time positioning will define the position fix of a G.P.S. receiver somewhere within an imaginary circle having a radius of 100 meters (300 feet) in any direction. This means the instantaneous position displayed by a G.P.S. Receiver can be different from the actual true position by 100 meters in any direction. Although it would appear that this positional error is a significant shortcoming of the Global Positioning System, it is actually an intentional degradation of the real-time position fix known as SA (Selective Availability). Only military G.P.S. receivers are "selectively available" to receive and process a scrambled second frequency P-Code (Precise Code) which is able

to render real-time position fixes within the range of 10 meters. Single frequency civilian G.P.S. receivers are given access to a less precise radio frequency code known as CA-Code (Course Acquisition Code). Generally speaking, Selective Availability is a method devised by the Department of Defense to intentionally downgrade the CA-Code in order to keep unauthorized users (the bad guys) from obtaining precise instantaneous position fixes and launching mobile nuclear warheads against authorized users (the good guys).

A real-time position fix of ± 100 meters is certainly accurate enough to navigate a cruise ship from San Francisco to Singapore, but it is obviously not accurate enough for precise Land Surveying measurement. A computer procedure known as Post Processing is used to change the inaccurate navigational real-time positioning data into precise geodetic relative positioning data using a process similar in theory to a post-dated check. Regardless of the date on a check, a check is actually worthless until the bank processes it and exchanges the check for cold hard cash. In much the same way, the G.P.S. Data collected by a receiver is only inaccurate navigational data until a computer is used to process the data into a form that can be used for precise geodetic measurement. Because the magnitude and direction of the positional error is relatively the same for all G.P.S. receivers that are simultaneously collecting satellite signal data, the real-time positional error can be isolated as a constant and its affect can be canceled out of the calculations during Post Processing. Errors such as these are commonly known as "systematic errors" in that such errors are relatively consistent, and once identified, can be removed from an entire "system" of calculations.

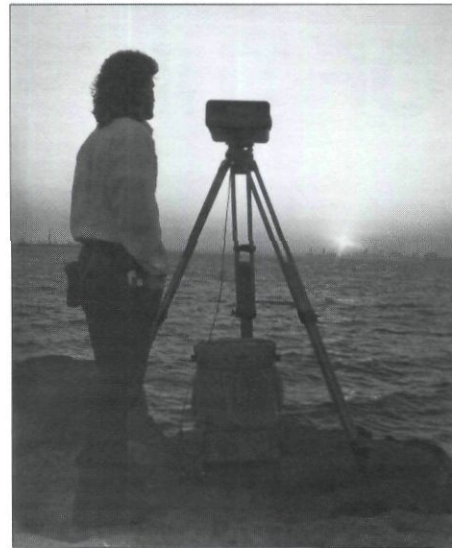
While the real-time position fix for all G.P.S. receivers in an observation session can be in error up to 100 meters in any direction, the vector

measurements between observation points will remain very precise for vector distances up to 15 kilometers (about 10 miles) with consistent results in the range of 1 centimeter (about .03 of a foot). If a G.P.S. control survey can be anchored on a control point with a precise geodetic latitude and longitude, a computer can be used to translate the real-time navigational position fix values onto the precise record latitude and longitude values. Therefore, by way of a method known as Differential Positioning, precise vector measurements between G.P.S. observation points are applied to a precisely anchored "Point Of Beginning" rendering precise position fixes for all the observation points of a G.P.S. survey. (Simplified yes, but true.)

Finally, a Land Surveyor can transform G.P.S. 3-dimensional vector measurements into 2-dimensional distance measurements based on a common statewide reference system known as a state plane coordinate system. A state plane coordinate system

can be visualized as a large sheet of graph paper (grid paper) superimposed over an entire state at some constant elevation. (Actually, some states like California need several zones in order to cover the entire state.) By definition, the "plane" in a state plane coordinate system is a perfectly flat, horizontal surface which does not take into account the curvature of the Earth. A state plane coordinate system creates a standardized reference for all Land Surveyors to share mapping information similar to the way standardized highway traffic signs allow people from Newport Beach to drive in New York City (Good Luck!). Individual Land Surveyors are able to apply specific multipliers for project latitude (scale factor) and project elevation (elevation factor) in order to adjust any state plane coordinate map to fit specific local conditions. The combination of these two factors is often shown on a map or report as a local project combination factor. Land Surveyors will use this combination factor to transform

state plane grid coordinates to local ground coordinates and visa-versa, in order to integrate smaller plane surveying projects with larger geodetic surveying projects involving measurement techniques such as G.P.S. ⊕



CLSA member David Paul Johnson is the GPS Project Surveyor for Greiner Inc. Article transcription by Susan Alosio and Carol Bazan. Photograph by Sam Snow.

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CALIFORNIA — THE NORTHEAST OF THE '90S

By Tom Mastin, P.L.S.

AN MBA ISN'T required to know that the economy of surveying in this great State is weaker than Joe Namath's knees. This State has been jolted by the worst recession since the 1930s. For the first time Californians are seriously questioning the long run competitiveness of the State's economy. Many economist compare this to the slump that hit the northeast 20 years ago, which they are still trying to recover from.

What causes a recession of this magnitude to hit the State? Well obviously there is currently a global recession, however there are signs that the rest of the country has not been hit as hard as California. The States GNP fell 3.4 percent last year whereas the national drop was only 0.7 percent. The work force in California is down 5 percent of what it was, which is twice the rate of the Nation. Three of the biggest industries in California have all been hit hard. We all know and see what has happened to real estate development, especially new building starts which generates much of the surveying economy in California. Add to that the deep cuts in defense spending and the massive layoffs in the electronics industry and you can see what the State must overcome.

There are even deeper problems within California that must be overcome. After last years largest ever tax increase the State still has a severe deficit problem. The State has tripled its real per capita spending over the last three decades while real per capita income has only doubled. In the 1980s, the rapid population growth was in the taxpaying ages of 18-64.

Although the rapid population growth is expected to continue through the '90s the growth will be in the ages 5-17.

The State is considered by many to be anti-business. This is actually fueling that increase in employment in the other western states. Public policy is much less supportive of growth than in the past. Public services are deteriorating at an alarming rate. There are moratoriums throughout the state due to water and sewer deficiencies. The education system is being severely tested which is all decreasing the high quality of life that has come to be expected in California. Failure to deal with issues of regional land use and growth have not stopped the influx of people; it has only made life less pleasant.

Where is California going in the future? Well, the national economy is truly dependent on the states economy. As this is written, the elections have not been held, so the direction that the nation intends to go is still uncertain. It is certain that whoever wins the seat to the highest office in the nation has their work cut out for them over the next couple of years. The State's high technology businesses should benefit from US trade with the Pacific Rim and Latin American economies in the 1990s. However long range problems need to be addressed. There needs to be reform within the public sector. Since Proposition 13, voters have time and again fought increases in taxes that would finance maintenance of the infrastructure and needed improvements in education. The voters are directing their ire at what they see as a bloated

multilayered behemoth whose main function is to generate make work to justify over inflated budgets. This is no more evident then in the rumblings of Northern Californians who have no desire to pay, with their taxes, for services that benefit southern California. The frustration has generated efforts to create two states out of California.

What does this mean to the future of surveying in this State? The only thing that can be said with great certainty is that as much as surveying is changing due to advances in technology, surveying businesses will change due to the shattered economy in California. Surveying businesses can specialize, diversify or stay with the status quo. Those that stay with the status quo will suffer the most. The skill in surviving is adaptability. Those that adapt their businesses to meet the needs of the '90s will be those that are still around in the 21st Century.

The larger surveying companies that will weather the recession will be those that expand their abilities and their markets. It is anticipated that there will be an explosion in the Pacific Rim economies throughout the '90s. If the Fair Trade Agreement takes effect, the Mexican market will be available. Besides increased markets for the new technologies of GIS and GPS, there will be increased need for environmental hazard surveys. Also clean-air legislation will mandate increased alternate transportation spending which will in turn generate right-of-way acquisitions, strip surveys and construction surveying of bike trails and rail lines. Those large surveying companies that come out of the recession will be leaner then the pre-recession days, enabling them to more quickly respond to potential new markets.

The smaller surveying companies also have the opportunity to diversify their markets. Those who attended Dr. Fareed Nadar's seminar at the CLSA Spring '92 conference in Sparks know that there are vast potentials for surveyors within the real estate and appraisal professions as well as the ever increasing role of

land planners. With the land surveyors background and training in unbiased reporting these fields are a natural extension. Those businesses that take advantage of these slow times to acquire the expertise in these fields will expand their markets and increase their client base. The truly untapped area that will expand in leaps in bounds in the '90s is land planning. With the advent of the California Environmental Quality Act and increase public pressure for more restrictive growth there is a dire lack of private planners, especially in the rural areas. These areas are just beginning the method of "report justified growth management." This method, in use for years within the larger urban areas, manages growth by the law of natural selection, where only those that can provide the myriad of reports will succeed. This generates the need of experts in environmental reports as well as processing

and coordination. The best opportunity to become an expert in the field is to sit on planning or advisory committees. Many of these committees are seeking members with knowledge of land uses.

The other alternative for the small surveying companies is to specialize. This process requires a detailed review of the current work being performed, the staff abilities and the company's reputation. Companies must determine which fields within surveying they can work in most efficiently. Then the areas within those fields that the company wants to work in must be determined. All other extraneous activities should be stripped out of the company. This will create a lean business that can be efficient and effective within those selected fields. These specializations should then be promoted with the emphasis on the idea that these are the only fields that the

company will pursue. The benefits of this approach are that although there may initially be a smaller client base, it will be a more loyal base. In the long run the company will prosper if it does become truly effective and efficient in those fields as it slowly build the loyal client base. The other benefit is by cutting out the non-productive areas of the business a higher net profit should occur.

In summary, with a recession hitting California harder than anywhere else, the whole surveying community is going to have to tighten its belt. Those companies, however who take advantage of this time to look at their current business plan and revise it to reflect the expected changes in the California economy are the ones who will weather this storm the best. If a majority of the surveying companies can change their structure so they prosper during the '90s the profession as a whole will benefit. ⊕

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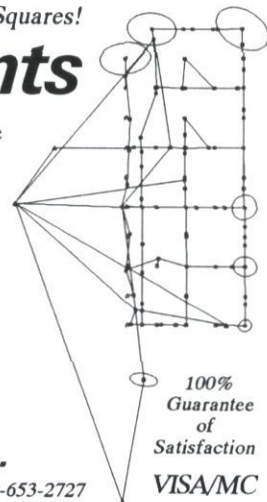
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GEORGE DERBY — PRANKSTER OF RENOWN

HARDSHIP, AVARICE, and isolation. These were among the companions of the Forty-Niners after they reached California.

In the early Gold Rush years, these grim sidekicks helped explain why newcomers placed a premium on humor. And the appreciation of it explains why so many of them began to enjoy the wit and (when they were played on others) the practical jokes of Lt. George Horatio Derby.

He was one of California's first humorists. And as with nearly all luminaries, fictitious stories sprouted about him. One was the reason for his transfer West.

He was assigned, so the tale goes, to survey the Tombigbee River "to see how far up it runs." Lt. Derby is supposed to have responded in great detail how he had studied the river and its adjoining topography. He even interviewed settlers along the river's banks in Alabama and Mississippi. "My conclusion," he wrote, "is that the Tombigbee River does not run up, but down."

Secretary of War Jefferson Davis reportedly was not amused. Soon Lt. Derby was sweating with General Bennett Riley and his men exploring the Sacramento and San Joaquin valleys. Then onto even hotter terrain — Fort Yuma in California's Imperial County, just across the border from Yuma, Arizona. His "exile" there didn't diminish his penchant for practical jokes and witticisms.

"One of our Fort Yuma men died," the lieutenant would tell newcomers, "and unfortunately went to hell. He wasn't there one day before he telegraphed for his blankets."

Fort Yuma hens, Derby insisted, laid their eggs hard-boiled. Cooler climates didn't change him. It is said that at a rousing ball in Sonoma, Derby's brainstorm was to switch two babies and their toys and blankets into each others basket, so their parents took home the wrong infants when the party ended. Owen Wister borrowed the incident for his novel *The Virginian*.

Derby was transferred to San Diego shortly before he turned 30. Word soon got around that he'd built a dam alongside the San Diego River instead of across it, perhaps as revenge for his transfer. This one wasn't a joke, though. Derby, a crackerjack engineer in the Corps of Topographical Engineers, was following orders to try to shift the river back to its original bed and thus solve the silt buildup in the city's harbor.

One Derby classic occurred to him while riding in a carriage with two other passengers. He confided to each of them in turn, "Oh, by the way. Our other passenger is almost stone deaf." Then he sat back poker-faced during the shouting match that followed.

Derby was born in Massachusetts in 1823. He wrote

two books of humor — Phoenixiana and The Squibob Papers — and both enjoyed good sales until their characters and actions became outdated.

His writing skill served Derby well in August 1853 when John Judson Ames, editor of the weekly four-page San Diego Herald, asked him to keep an eye on things at the paper while he went to a Democratic party meeting in San Francisco. Soon, editorial page readers who had been urged to elect the Democratic candidate for governor found themselves being asked to switch their support to the Whig candidate — who later ended up carrying San Diego, much to Ames' discomfiture.

Derby was sent to Oregon and Washington Territory to survey military roads. He wrote, "It rains incessantly twenty-six hours a day for seventeen months of the year..."

Next he headed for New York in 1856 where, despite illness and partial blindness, he managed to play a few more pranks. After his death in 1861, a friend had this to say: "What other men would sacrifice for ambition, for love, for the attainment of fortune or personal aggrandizement, he would sacrifice for fun — his best friend would have no more chance of escape than his worst enemy."

Editor's Note: I want to thank George R. Dunbar, P.L.S. for repeatedly providing us with the articles, such as the previous one, and having the time to follow up to make sure we got this and will use it. Mr. Dunbar is one of those lucky few whose recent retirement is a reward for his years of hard work and not forced into it by economic factors. His retirement will be the associations gain as he has even more time to keep us on the straight and narrow.

(Reprinted with permission from PGandE Progress, Volume 57, San Francisco, December 1980, Number 12.) ⊕

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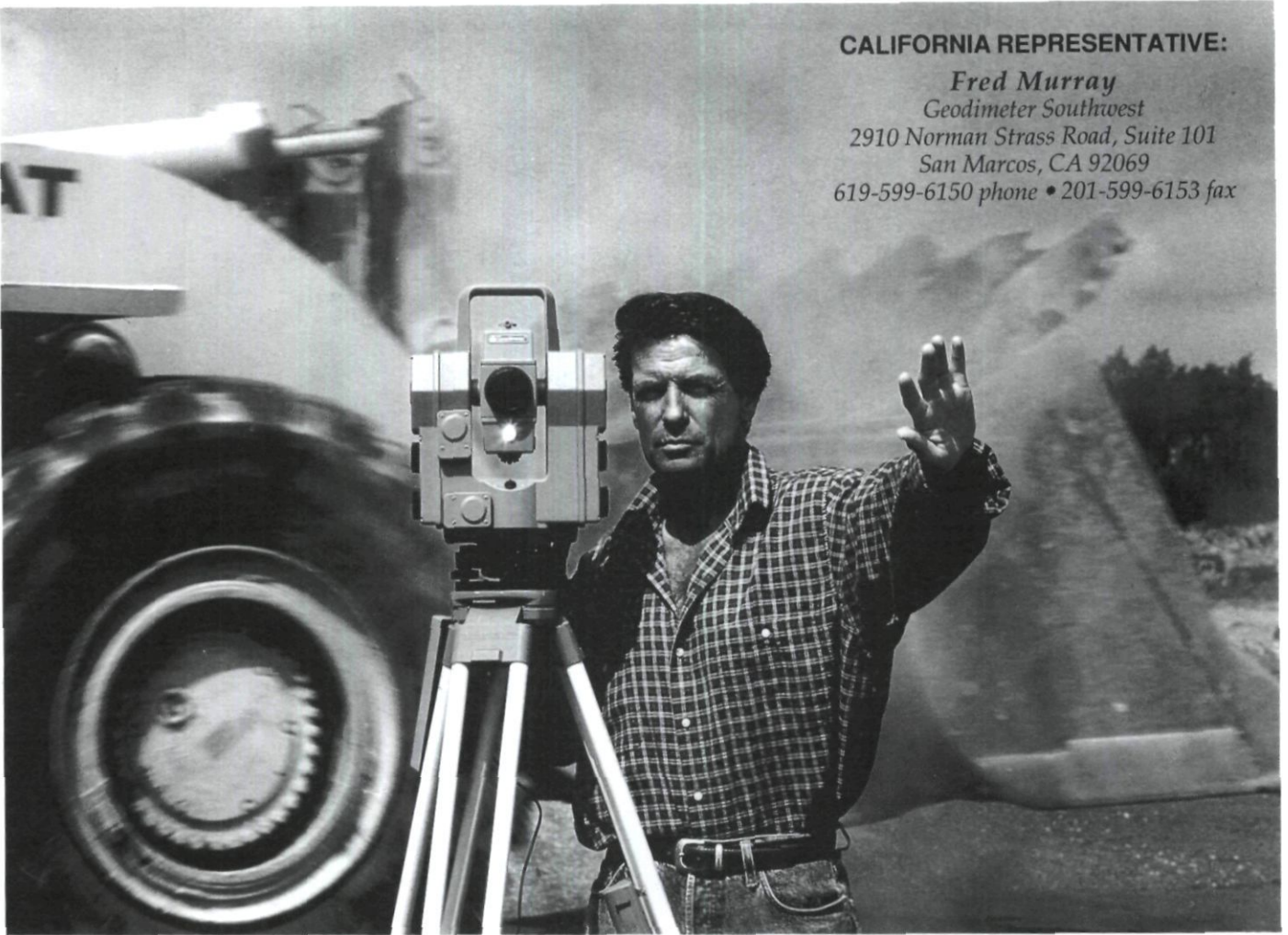
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PHEONIXIA

By George Derby

ON CONSULTING with my assistants, I had determined to select, as a base for our operations, a line joining the summit of Telegraph Hill with the extremity of the wharf at Oakland, and two large iron thirty-two pounders were accordingly procured, and at great expense imbedded in the earth, one at each extremity of the line, to mark the initial points. On placing compasses over these points to determine the bearing of the base, we were extremely perplexed by the unaccountable local attraction that prevailed; and were compelled, in consequence, to select a new position.

This we finally concluded to adopt between Fort Point and Sausalito; but, on attempting to measure the base, we were deterred by the unexpected depth of the water intervening. Disliking to abandon our new line, which had been selected with much care and at great expense, I determined to employ in its measurement a reflecting instrument, used very successfully by the United States Coast Survey. I therefore directed my assistants to procure me a "Heliotrope," but after being annoyed by having brought to me successively a sweet-smelling shrub of that name, and a box of "Lubin's Extract" to select from, it was finally ascertained, that no such instrument could be procured in California. In this extremity, I bethought myself of using as a substitute the flash of gunpowder.

Wishing to satisfy myself of its practicability by an experiment, I placed Dr. Dunshunner at a distance of forty paces from my Theodolite, with a flintlock musket, carefully primed, and directed him to flash in the pan, when I should wave my hand.

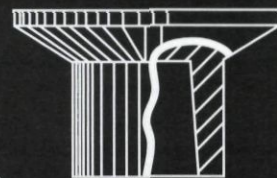
Having covered the Doctor with the Theodolite, and by a movement of the tangent screw placed the intersection of the cross lines directly over the muzzle of the musket, I accordingly waved; when I was astounded by a tremendous report, a violent blow in the eye, and the instantaneous disappearance of the instrument.

Observing Dr. Dunshunner lying on his back in one direction, and my hat, which had been violently torn from my head, at about the same distance in another, I concluded that the musket had been accidentally loaded. Such proved to be the case; the marks of three buckshot were found in my hat, and a shower of screws, broken lenses and pieces of brass, which shortly fell around us, told where the ball had struck, and bore fearful testimony to the accuracy of Dr. Dunshunner's practice. Believing these experiments more curious than useful, I abandoned the use of the "Heliotrope" or its substitutes, and determined to reverse the usual process, and arrive at the length of the base line by subsequent triangulation. The distance from Fort Point to Sausalito by the solution of a mean of 1,867,434,926,465 triangles, being determined to be exactly 324 feet. This result differed very much from our preconceived ideas and from the popular opinion; the distance being generally supposed to be some ten miles; but I will stake my professional reputation on the accuracy of our work, and there can, of course, be no disputing the elucidations of science, or facts demonstrated by mathematical process, however incredible they may appear per se.

Editor's Note: Excerpts from Phoenixiana, one of George Derby's books. ⊕



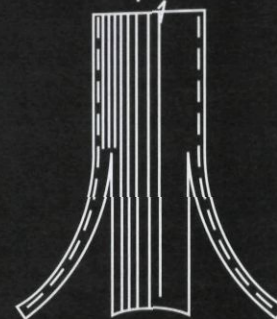
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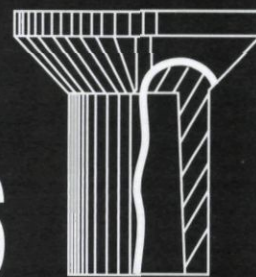


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GRS 80, NAD 83, WGS 84 WHAT'S THE DIFFERENCE?

(or how to impress your friends and family)

By Michael R. McGee, P.L.S.

DATUM, DATUM, what datum, or will the real one please stand up. Most surveyors understand that NAD 27 and NAD 83 are unrelated datums; however, often when surveyors get into a GPS discussion regarding datums, the question comes up "GRS 80, NAD 83, WGS 84, what's the difference?" The answer is usually given speculative as "essentially none," that the discrepancy in $1/f$ (the Earth's flattening parameter) is a type-o in the 6th decimal place. Well, curiosity got the best of me, and after some research, I'm here to set the record straight. The North American Datum of 1983 (NAD 83) is the basis for the National Geodetic Reference System (NGRS) and the High Accuracy Reference Network (HARN), which is the State's High Precision Geodetic Network (HPGN).

Excerpting from the National Ocean and Atmospheric Agency's Manual NOS NGS 5, Titled "State Plane Coordinate System of 1983," by James E. Stem, January 1989.

The ellipsoid that forms the basis of NAD 83, and consequently the SPCS 83, is identified as the Geodetic Reference System of 1980 (GRS 80)....

The parameters of GRS 80 were adopted by the XVII General Assembly of the International Union of Geodesy and Geophysics meeting in 1989 at Canberra, Australia. Since only **one** of the four GRS 80 defining parameters (semimajor axis "a") is an element of the geometric ellipsoid, a **second geometric constant** ("b", " $1/f$ ", or " e^2 ") **must be derived** from the three GRS 80 parameters of physical geodesy. (Parameters follow.)

Now that the origin of NAD 83 is clearly understood, let's look at WGS 84, the basis for the DoD's Global Positioning System (GPS).

Excerpting from Defense Mapping Agency Technical Report 8350.2, titled *DEPARTMENT OF DEFENSE WORLD GEODETIC SYSTEM 1984, ITS DEFINITION AND RELATIONSHIPS WITH LOCAL GEODETIC SYSTEMS*, September 30, 1987, Reprinted January 1991:

FOREWORD

1. This technical report presents the Department of Defense (DoD) World Geodetic System 1984 (WGS 84). The development of WGS 84 was initiated for the purpose of providing the more accurate geodetic and gravitational data required by DoD navigation and weapon systems. The new system represents the Defense Mapping Agency's (DMA) modeling of the Earth from geometric, geodetic, and gravitational standpoint using data, techniques, and technology available through early 1984.

3. WGS 84 ELLIPSOID

3.1 General

In geodetic applications, three different surfaces or earth figures are normally involved. In addition to the earth's natural or physical surface, these include a geometric or mathematical reference surface, the ellipsoid, and an equipotential surface called the geoid. In determining the WGS 84 Ellipsoid and associated parameters, the WGS 84 Development committee, in keeping with DMA guidance, decided quite early to closely adhere to the thoughts and approach used by the international Union of Geodesy and Geophysics (IUGG) when the latter established and adopted Geodetic Reference System 1980 (GRS 80). Accordingly, a geocentric equipotential ellipsoid of revolution was taken as the form for the WGS 84 Ellipsoid. The parameters selected to define the WGS 84 Ellipsoid are the semimajor axis (a), the earth's gravitational constant (GM), the normalized second degree zonal gravitational coefficient (\bar{C}_{20}), and the angular velocity (ω) of the earth. **These parameters are identical to those for the GRS 80 Ellipsoid with one minor exception.** The coefficient form used

for the second degree zonal is that of the WGS 84 Earth Gravitational Model rather than the notation J_2 used with GRS 80.

3.4 Comments

The four defining parameters (a, \bar{C}_{20} , ω , GM) of the WGS 84 Ellipsoid were used to calculate the more commonly used geometric and physical constants associated with the WGS 84 Ellipsoid. **As a result of the use of \bar{C}_{20} , in the form described, the derived WGS 84 Ellipsoid parameters are slightly different from their GRS 80 Ellipsoid counterparts.** Although these minute parameter differences and the conversion of the GRS 80 J_2 -values to \bar{C}_{20} are insignificant from a practical standpoint, it has been more appropriate to refer to the ellipsoid used with WGS 84 as the WGS 84 Ellipsoid.

In contrast, since NAD 83 does not have an associated EGM, the J_2 to \bar{C}_{20} conversion does not arise and the ellipsoid used with NAD 83 by the National Geodetic Survey (NGS) is, **in name and in both defined and derived parameters, the GRS 80 Ellipsoid.** Although it is important to know that **these small undesirable inconsistencies exist between the WGS 84 and the GRS 80 Ellipsoids, from a practical application standpoint they are insignificant.** This is especially true with respect to the **defining parameters.** Therefore, as long as the preceding is recognized, it can be stated that WGS 84 and NAD 83 are based on the same ellipsoid.

There, wasn't that simple. The parameters for both systems follow:

The geometric definition of the WGS 84 is:

$$a = 6,378,137. \text{ m (exact by definition)}$$
$$1/f = 298.257223563 \text{ (to 12 significant digits by computation)}$$

From these two numbers, any other desired constants of geometric geodesy may be derived. For example:

$$b = 6,356,752.3142 \text{ m}$$
$$e^2 = 0.00669437999013$$

The geometric definition of NAD 83 is:

$$a = 6,378,137. \text{ m (exact by definition)}$$
$$1/f = 298.25722210088 \text{ (to 14 significant digits by computation)}$$

From these two numbers, any other desired constants of geometric geodesy may be derived. For example, to 14 significant digits:

$$b = 6,356,752.3141403$$
$$e^2 = 0.0066943800229034 \oplus$$

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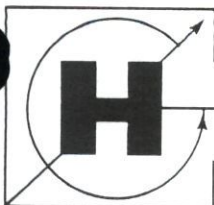
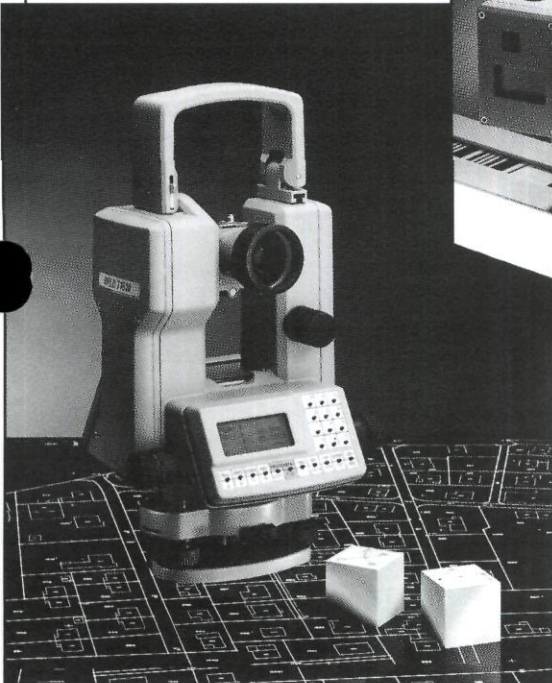
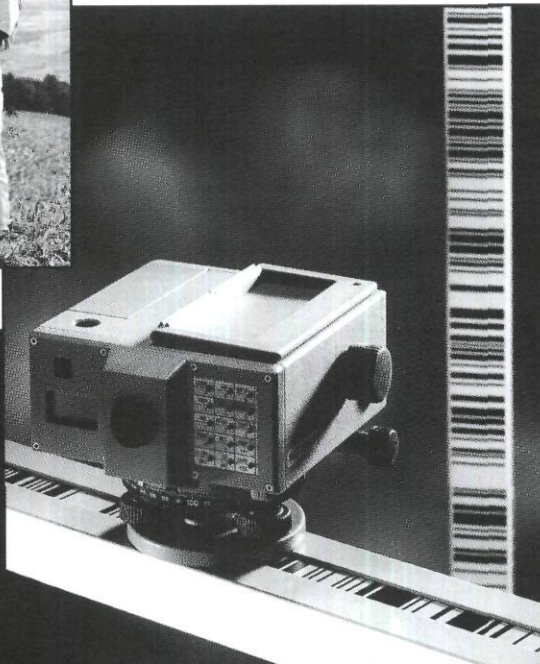
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CLSA ADVANCED TECHNOLOGIES COMMITTEE (ATC)

By Michael McGee, P.L.S.

THE ADVANCED Technologies Committee of CLSA has been directed to keep abreast of the latest surveying technologies and keep the Board of Directors and the Executive Committee of CLSA apprised of the applications for CLSA and its members. The committee's objectives are currently open to discussion and suggestion. The areas of interest presently identified are spatial systems, NAD83, HPGN, NAVD88, GPS, GIS, software, education and acquisition of a technical library. Legislation as it relates to GPS, GIS and advanced technologies will be of prime interest. It is expected that committee members will review, write and publish articles related to technology, acquire and redistribute software to the membership and provide seminars. Timely alerts will be published in the newsletter and more extensive educational articles in the *Cal Surveyor*.

The committee has acquired the new NGS Horizontal-Vertical Data Base for California. It is the process of separating the data out by county and packaging the data with a program to search the data. A subcommittee of the Advanced Technologies Committee will review the standards for GPS surveying. This committee will invite other organizations to participate in a joint effort to represent California and make recommendations to the Federal Geodetic Control Subcommittee.

The Committee members are presently Michael McGee, P.L.S.; Will Finrock, P.L.S.; Michael Stephens; Bob Reese, P.L.S.; and Greg Helmer, P.L.S. Although not a member, the committee will interact with Tom Mastin as Editor of *The Cal Surveyor*.

TO ALL INTERESTED IN GPS STANDARDS AND SPECIFICATIONS

Re: Federal Geodetic Control Subcommittee GPS Standards and Specifications for Relative Positioning

The Advanced Technologies Committee of CLSA will sponsor a forum at the Fresno Surveying Conference at 11:30 a.m. on January 30, 1992, at the Centre Plaza Holiday Inn, Fresno, California. All interested individuals and agencies are invited to attend. The purpose of this meeting is to initiate discussion within the surveying community in California as to how we can contribute to the efforts of the FGCS to update the GPS Standards and Specifications for Relative Positioning. There is an important need to update these standards and specifications and bring them in conformance with present practices and technology. It has been suggested that California consider adopting, through endorsement by private and public agencies, "interim" standards and methods more in line with the present state of the art and practices. The following letter outlines our concerns in more detail. If you are interested in attending and being on the mailing list, please write to:

CLSA
Attention: ATC:FGCS
P.O. Box 9098
Santa Rosa, CA 95405

Michael McGee, Chair

Rear Admiral J. Austin Yeager, Director
Coast and Geodetic Survey
National Ocean Service, NOAA
Rockville, MD 20852

Subject: Federal Geodetic Control Subcommittee GPS Standards and Specifications

For the past seven years, the Federal

Geodetic Control Subcommittee, and its predecessor, have provided valuable leadership, guiding the surveying and mapping community in the proper use of GPS for establishing precise geodetic control networks. This expert guidance has prevented the proliferation of geodetic disasters which could have occurred from the indiscriminate, unmonitored, use of GPS, and is in part responsible for the successes of GPS surveying today. The FGCS leadership is marked by a conservative approach which we applaud and do not wish compromised by the proposals we set forth here.

I am writing to you on behalf of the Advanced Technologies Committee of the California Land Surveyors Association (CLSA) to express our concern regarding the existing standards and specifications for GPS geodetic control networks. The latest edition of the subject document, *Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques, Version 5.0: May 11, 1988*, has become outdated to the point of being disregarded, or in some cases completely ignored, in the interest of exploiting advances in GPS technology. CLSA believes that the credibility of the Standards and Specifications are in jeopardy, and that measures should be taken to insure the continued leadership and guidance which has shown such success.

Serious deficiencies exist in both the standards and specifications. These should be addressed and in that order. We recognize that the rapid technological advancement of GPS, together with its experimental status, make the development of definitive specifications nearly impossible at this time. This does not, however, prevent revision of the standards to address directly the issues which most seriously limit the effectiveness of the document. Three critical issues are suggested for revision:

1. Direct recognition should be given within the introduction and background that high-production methods such as kinematic and fast ambiguity resolution have the proven capability to achieve results consistent with at least some of the accuracy standards. Recognition of the probability that future advances show similar promise is also needed.
2. Appendix E. regarding elevation difference accuracy standards should be incorporated into the document, with attention given to accuracy levels using Geoid 90 and other highprecision geoid models together with least squares collocation methods.
3. The question regarding positional error vs. proportional error should be

resolved. If resolution can not be achieved, the question should be addressed in the introduction with appropriate methods for determining each discussed.

Obviously a tremendous amount of research and discussion is needed to fully incorporate high-production GPS surveying techniques and GPS-derived orthometric heights into a comprehensive set of standards and specifications. Addressing these techniques and their viability within a revision to the existing standards will allow individuals and agencies to take advantage of their known benefits, and will encourage much needed efforts to better define their capability and limitations. We feel that the incorporation of these suggested revisions will help to support the integrity of the document as a valid guideline for modern geodetic surveying methods.

This committee is charged with pursuing avenues to inform our membership regarding advances in surveying and mapping methods, and to explore areas where our knowledge and expertise can aid in the implementation of new technologies. To this goal, one of our efforts will be to collect information from our colleagues regarding the GPS standards and specifications and to forward this to the FGCS for consideration. Our initial discussions have revealed interest and opinions from individuals and agencies within as well as outside of CLSA. We hope that our input will be found as helpful rather than complicating an already difficult issue.

It is our sincere desire to encourage the development and use of appropriate standards and specifications for geodetic control networks. In no way do we wish to criticize the efforts of the FGCS. We fully recognize the limited resources of the subcommittee and the formidable task which is at hand. This discussion is presented to express our perception of a critical condition and to offer these suggestions together with our interest and support.

Thank you for your attention to this subject.

Greg Helmer, P.L.S.

CALIFORNIA GPS PROJECT INDEX CONTEMPLATED

Have you ever done a control project and afterwards found another control project had just been completed in your

own backyard? Or have you ever examined local control and tried to work out an observation schedule that would allow you rationalize the pack-in to that 2nd order monument on the mountain top? Wouldn't it be great if you could find out who just surveyed those two dozen B net control points in your corner of the county?

If so, perhaps you would be interested in the proposal set forth at the October 17, 1992, meeting of the CLSA Advanced Technologies Committee (ATC). The idea is to **create a voluntary registry for GPS control projects** within or adjacent to the State of California. At present several scenarios have been proffered for the form and content of just such an index. Some of the suggestions have been 1) an extensive and very complete database containing data such as locations, descriptions, coordinate values, control classifications and SPC zones of the points in a network, 2) a list of brief descriptions which contain the approximate latitude and longitude of the networks' centers, the number of points measured and the agency, firm or individual acting as contact for project information and 3) graphic tabulation of project envelopes on a map of the State which could be available in hardcopy or .dxf format.

If you are interested in contributing to this central clearing house for GPS projects and/or have surveys that you feel would be of use in network densification, your ideas and comments would be greatly appreciated. Further, the ATC would be interested in your thoughts on presentation formats, data you would like to see be available (and data you would like to see NOT be available) along with any other pertinent information or helpful hints. Communiques need not be fancy: a post card will do.

Please address all correspondence to:

GPSINDEX.ATC
c/o Robert J. Reese, P.L.S.
6423 Squire Canyon
San Luis Obispo CA 93401

You may FAX your information/ideas/comments after 1700 hrs P.T. to:

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(805) 489-6723

Your responses, contributions and ideas will be compiled and presented in a future *California Surveyor* article. ⊕

NATIONAL NEWS

August 27, 1992

Richard E. Lomax
President, NSPS
243 South Sheldon
Charlotte, MI 48813

Dear Mr. Lomax:

I am pleased to advise you that the delegates to the NCEES 1992 Annual Meeting voted to ratify the membership of the National Society of Professional Surveyors in the Participating Organizations Liaison Council (POLC). The membership is effective as of August 13, 1992.

You indicated in your letter of March 1, 1992, that Ralph Harris has been designated as NSPS' representative to the POLC. Unless I hear otherwise, I will assume that Ralph will continue as the representative. The next meeting of the POLC is scheduled for March 13-14, 1993, at Salt Lake City, Utah. The site for the meeting has not been selected yet. The travel expenses for your representative to attend the meeting are the responsibility of NSPS.

The annual membership fees for 1993 will be \$200.00. NSPS will be billed for the fees in January 1993.

The NCEES Constitution and Bylaws, Policy Manual, and Model law were revised by the actions of the delegates at the 1992 Annual Meeting and the revised editions will be provided to NSPS headquarters and your representative as soon as they are available.

NCEES looks forward to a long and mutually beneficial relationship with NSPS.

Respectfully,

Roger B. Stricklin, Jr.
Executive Director, NCEES ⊕



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The California HPGN: What is the Next Step?

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North American Vertical Datum '88

Photogrammetry- State of the Industry

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Friday

Mapping Practices:

Phasing of Condominium CADME Projects
Solar and View Easements

Joint Luncheon

GIS Elements-City of Riverside CADME Project

Subdivision Map Act: Issues for the 90's

Dinner / Live Entertainment

Saturday

Business Practices:

Effective Presentations at Selection Interviews

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BENEFITS OF CLSA

BENEFITS I GAINED FROM BEING A MEMBER OF CLSA

By Gary Leonard, LS 5303

In 1986, I became a corporate member of CLSA. The following year, I joined the Sacramento Chapter serving as chapter secretary, then vice-president and president over the following two years. In 1990, I was asked to join the Legislative Committee, which I did. Since my involvement, I have had the pleasure of developing both working as well as personal friendships with other surveyors in the chapter and the state association. These relationships have allowed me the opportunity of contacting these individuals to ask for advice and opinions on various problems that I have been faced with. In some instances it has been reassuring to find that their solution to the problem was identical to mine. In other instances it was educational to learn a new solution to a problem that seemed to have only one solution.

Membership offers other benefits such as access to the various publications, reduced rates for copies of the Subdivision Map Act, Land Surveyors Act, and other items. As a result of my involvement with the Legislative Committee my knowledge of the Map Act and the LS Act have increased. I know all the other members read the Map Act and the LS Act several times a year from cover to cover without encouragement. They review the acts for the pure reading enjoyment it provides as well as the cerebral stimulation. Sure, there are always one or two surveyors who read these acts as a cure for insomnia, but they are the exception and not the rule. I just happen to need the motivation of commitment to insure that I review these stimulating

documents on a regular basis.

Some individuals may say that the association really hasn't done anything for them. I feel these statements are made by people who do not realize the accomplishments made by the active individuals in the Association on behalf of the entire membership.

I believe that the greatest benefits that I received from the organization have been in the form of friendships, personal satisfaction, a sense of accomplishment, and recognition for my efforts. These benefits are a result of my participation. What I have received both professionally and personally has been far greater than what I have given.

BENEFITS OF C.L.S.A. MEMBERSHIP

By James A. Hamblin

In response to your request of benefits of CLSA membership, I have listed the following:

- A) State legislative representation (very important to review and introduce bills and laws)
- B) Introduction to new methods and equipment (articles in magazines

and at conferences)

- C) Collective voice on local politics (chapters can write letters or have personnel attend chapter meetings to resolve problems)
- D) Chapter meetings (exchange of ideas and friendship — can be beneficial for employment)
- E) As a group, CLSA is representing surveyors on a higher professional level.

* It is with great regret that the editor must report that Jim and his wife died in November. His passing will be a great loss to the profession and to CLSA — see article on Page 16.

WHY DO I BELONG TO C.L.S.A.?

By R. Bruce Quinn, P.L.S.,
President Sonoma County Chapter

CLSA membership has allowed me to meet and discuss survey related issues with both the private and public sector of my profession. Your input will make a difference when you belong to CLSA. As a bonus, your state membership provides you with a fine quarterly publication.

I have belonged to CLSA for many years and find it an enlightening experience. ⊕



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The goal of the California Land Surveyors Association is to promote and enhance the profession of surveying, to promote the common good and welfare of its members, to promote and maintain the highest possible standards of professional ethics and practice, and to elevate the public's understanding of our profession. CLSA represents all land surveyors, whether they are employees or proprietors, whether in the public or the private sector.

Representation

- LOCAL: Your local chapter represents you in local issues. Through your chapter representative to the State Board of Directors, the individual member can direct the course CLSA will take.
- STATE: The surveyor is represented at the state level through an active legislative program, legislative advocate, and liaison with the State Board of Registration.
- REGIONAL: CLSA is an active member of the Western Federation of Professional Land Surveyors. This federation is composed of associations throughout the western United States and addresses regional issues.
- NATIONAL: Through institutional affiliation with the National Society of Professional Surveyors and the American Congress on Surveying and Mapping, CLSA is represented at the national level.

Education Opportunities

CLSA presents annual conferences which provide technical and business programs, as well as exhibits of the latest in surveying and computing technology. Seminars and workshops are presented to assist in continuing education. CLSA publishes the *California Surveyor* magazine and the *CLSA News* to keep the membership abreast of changing legislation, legal opinions, and other items which affect our profession.

Business and Professional Services

CLSA provides a fully staffed central office which is available to answer questions or to provide up-to-date referrals concerning legislation, educational opportunities, job opportunities, or other issues concerning our membership. Health and professional liability insurance programs are available to members.

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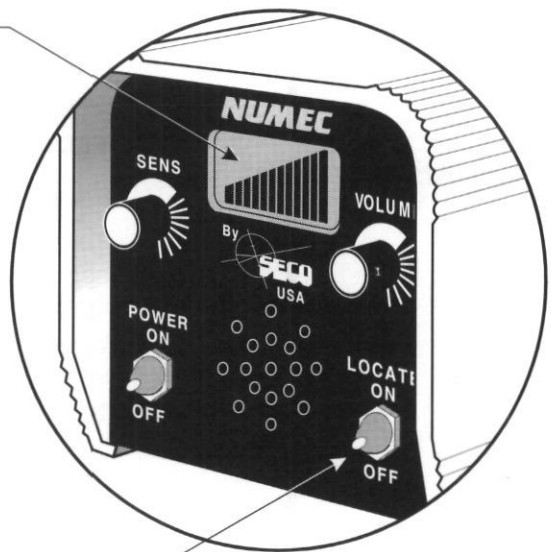
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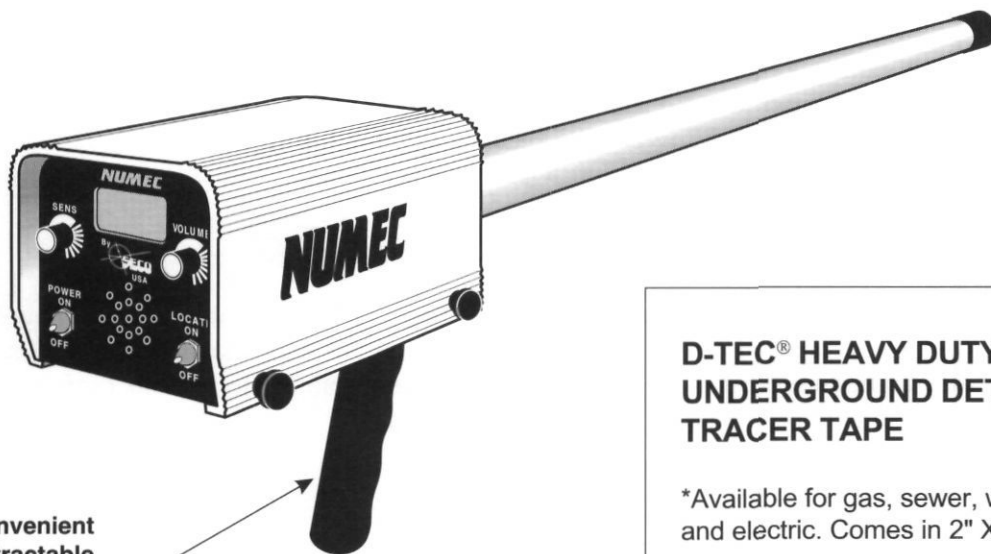
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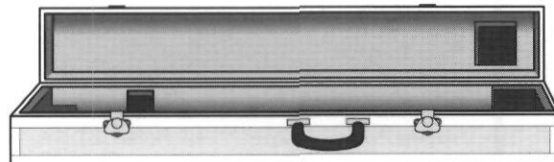


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